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SEPTEMBER 25, 1941

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The IRON AGE

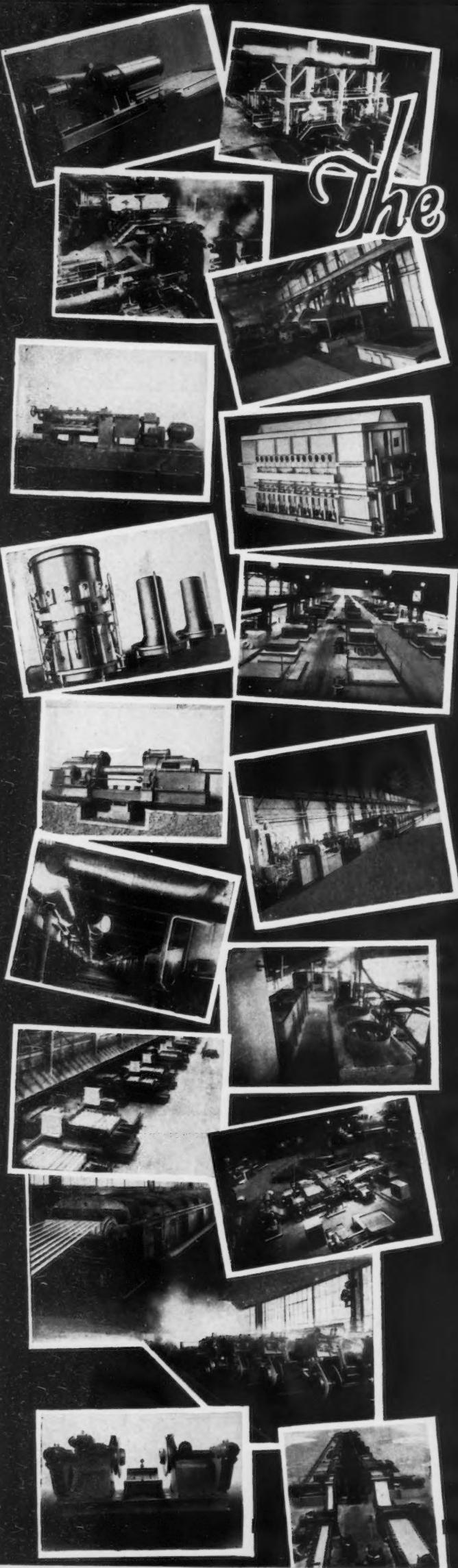


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SEPTEMBER 25, 1941

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THE IRON AGE

SEPTEMBER 25, 1941

ESTABLISHED 1855



Real and Imagined Shortages

HOW real are some of the shortages in materials that industry, especially non-defense industry, is now encountering to its discomfort?

One wonders about this after the petroleum shortage fiasco, which left Horrendous Harold so far out on a limb that no one but an Ickes could crawl back again without being shaken from the tree.

Here was a case where an imaginary shortage became a very real emergency in the minds of a large part of our population and threatened to induce a secondary bottleneck in five gallon gasoline cans, due to the rush on the part of the public to stock up before the stick-up.

Here was a case, too, that may be typical of others, in which a man who does not understand a business sets out to regulate it by attacking the consumer instead of the bottleneck. And by using as a weapon of attack the very famous one that Samson used in his slaying of the Philistines.*

I wonder if some of the other shortages that we are hearing so much about may not also be imaginary, or at least partly so. Especially the shortage of steel. No one has yet made a satisfactory explanation of why, with our present steel capacity, there is not enough to satisfy normal non-defense requirements after deducting all of the amounts required for defense and aid to the Democracies and Soviets.

Perhaps it may be that we need as regulators in Washington a larger proportion of the kind of men who know their industries from the ground up and a smaller proportion of the kind of men who would like to manage them without having gone through the hard process of learning what they are all about.

And that reminds me of another story. One about bees this time.

There are, it appears, three kinds of bees in each hive. There is the Queen bee, who bosses the gang, but who, of course, has never soiled her hands by doing any work.

There are the worker bees, who provide the food, defend the hive and do all the work, even to feeding the babies. They know the bee business from the ground up.

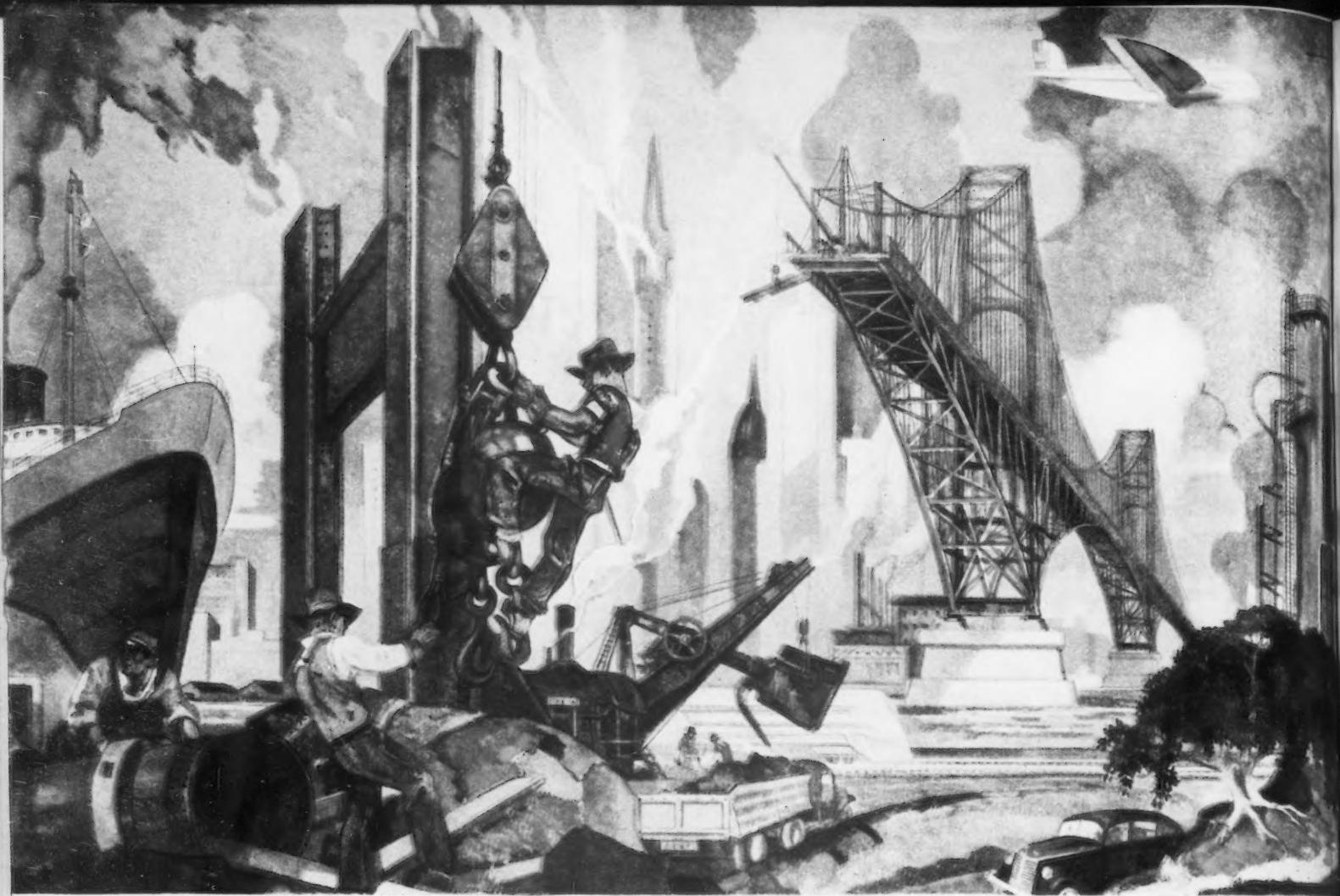
And then there are the drones, who never do or have done any work, but whose pleasant duty it is to stand ready to squire the queen upon request.

Probably the drones, from time to time, not having much to do, attempt to "kibitz" the working and run things. But they do not get away with it.

For every once in a while, there is a wholesale and effective house-cleaning in the hive during which the drones are "liquidated" as being both unnecessary and expensive to maintain.

After which the busy little bees keep on doing business as usual, and without bottlenecks!

* Old Testament, Book of Judges, Chapter 15, Verse 15.



This mural is one of four painted by Edward Trumbull for Inland Steel Co., as a part of the iron and steel exhibit in the Chicago Museum of Science and Industry.

The Record of Man's Progress Is the Story of Steel

Throughout the ages man has progressed as he has learned to use steel. But, in no age has he advanced so rapidly as in the last 85 years when new processes have given him steel in increasing quantities, of finer qualities, and at lower cost.

Steel has given to man the safety, speed and comfort of modern transportation by rail, on the highway, in the air, and across the seas. It has given him communication systems undreamed of when the American colonies were young. It is by means of steel that the drudgery of manual labor

has been lightened, and hours of work shortened in the factory, on the farm, and in the home. Steel has opened vast new markets, and created great opportunities for American workers. Today America is being made safe from aggression through the tremendous production of its steel mills.

In Inland laboratories and mills, applied research and scientific development are being directed at the problems of the future. Tomorrow's record of progress also will be the story of steel.

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Molybdenum High Speed Steels

"Mr. WHITE and the speaker stated in our patent that molybdenum can be substituted for tungsten in modern high speed steels and that one part of molybdenum will produce approximately the same effect as two parts of tungsten." These words were not spoken in this decade nor the last, but by F. W. Taylor in his famed address on "The Art of Cutting Metals," on December, 1906, to the American Society of Mechanical Engineers.

Other substantial evidence that the substitution of molybdenum for tungsten in high speed steels was well known at that time is the fact that the Sanderson Steel Co. marketed a molybdenum high speed steel under the trade name of "Mo.S.H." (molybdenum self-hardening) in 1898. Its chemistry differed considerably from modern high speed steels, but the significant elements were molybdenum and chromium and not tungsten and chromium. Why then was the use and further development of this type of steel discontinued? The problem of decarburization, still objectionable in the higher molybdenum types, even though today the problem can be solved, was no doubt the controlling reason. Furthermore, at that time there was neither strategic nor economic advantage in developing molybdenum steels.

New interest in molybdenum high speed steel started in 1927 with the realization of the large potential American production of molybdenum, which actuated the investigations of the Watertown Arsenal. These investigations covering a period of several years culminated in their Experimental Report No. 359, issued under date of June 30, 1930, recommending a steel containing 0.70 per cent carbon, 3.50 chromium, 9.50 molybdenum and 1.30 vanadium. An im-

portant contribution of this report was the evidence that decarburization in manufacture and heat treatment could be prevented by covering the steel with a coating of borax. Since that time developments have been along such orthodox lines that one cynic stated that the only recent discoveries in this field were that some compositions could be patented.

For many years, therefore, it has been generally recognized that the greatest difficulty with molybdenum high speed steel was its propensity to decarburization. Changes in manufacturing technique, developments in heat treating procedure and equipment, and chemical modifications have all focused on eliminating or substantially reducing the loss of surface carbon during heating or forging and hardening. In process of manufacture it has been found expedient to coat ingots and billets with borax or copper paint, and frequently it has also been necessary to remove the entire surface from billets before final rolling. Improved treating methods have resulted from experimental work with various types of coatings, salt baths, and controlled atmosphere furnaces. The chemical composition of the steel has been modified by replacing a small amount of the carbon content with boron and the addition of copper. The boron replacement while conducive to less decarburization embrittles the steel in forging to such

a degree that it can be used only in a limited amount. Copper also helps to prevent the decarburization caused by molybdenum but is insufficient to completely overcome the difficulty. However, all the molybdenum high speed steels can be heat treated without decarburization by the use of borax coatings, appropriate salt baths, or in furnaces capable of producing an atmosphere containing 20 per cent or more carbon monoxide. Carburization in varying degrees and depths may occur under the latter condition. It is not possible to categorically claim that decarburization will not occur on the higher molybdenum types, above 7 per cent, in the most frequently encountered high heat furnaces whose atmospheres are limited to about 15 per cent carbon monoxide. Under these conditions, best results will generally be obtained by the use of a low (about 1200 deg. F.) oxidizing preheat.

The X-ray diffraction analysis shows that when molybdenum is added to high speed steel it replaces the tungsten atom in the double carbide. X-ray patterns with the No. 2 Phragmen camera of tempered specimens of the 18 per cent tungsten type, TM-2 and TM-3, show three phases common to all three steels: retained austenite, primary martensite and double carbide. The lattice parameters of the carbide phase are shown in Table IV. It is significant to note

By J. P. GILL, Metallurgist, and ROBERT S. ROSE, Sales Metallurgist

TABLE I
Common Standard Molybdenum Steel Compositions

Type	C.	W.	Mo.	Cr.	Va.
TM-1	0.80	5.00-6.00	3.50-5.50	4.00	1.40-1.75
M-1	0.83	...	7.50-8.50	4.00	2.00
M-2	0.80	1.50	8.00-9.00	4.00	1.00

TABLE II
Molybdenum Steels That Are Available

Type	C.	W.	Mo.	Cr.	V.	Co.	B.
TM-1	0.83	5.00-6.00	3.50-5.50	4.00	1.40-1.75	...	...
TM-2	1.27	5.00-6.00	4.00-5.00	4.50	4.00	...	...
TM-3	1.25	...	8.00	4.50	4.00	...	...
TM-4	0.80	6.00	6.00	4.00	1.50	6.00	...
M-1	0.83	...	7.50-8.50	4.00	2.00	...	...
M-2	0.80	1.50	9.00	4.00	1.00	...	...
M-3	0.83	1.50	9.00	4.00	2.00	...	...
M-4	0.80	1.50	8.00	4.00	1.00	5.00	...
M-5	0.80	1.50	6.50	4.00	2.00	5.00	...
M-6	0.80	1.50	8.00	4.00	2.00	8.00	...
M-7	0.60	...	8.00	4.50	1.00	2.50	0.25
M-8	0.60	...	8.00	4.50	1.50	8.00	0.25

that the double carbide has the same parameter in all three types despite the fact that TM-3 has no tungsten and 18-4-1 no molybdenum. It is probable that since tungsten and molybdenum have almost equal atomic radii that the carbide phase can dissolve (isomorphous replacement) either or both kinds of atoms in varying proportion. Thus it may be expected that the effect on the properties and reactions of the high speed steel compositions is linear or proportional to the addition or replacement of either element.

A substantial replacement of molybdenum with tungsten increases the stability of the retained austenite, as can be seen in Table III, comparing TM-3 with TM-2. The former contains 8 per cent molybdenum with no tungsten, while in the latter 3 per cent molybdenum has been replaced with 5.65

per cent tungsten. For complete austenitic transformation in 2 hr., a temperature of 1020 deg. F. is required with TM-3 and 1080 deg. F. with TM-2. Moreover, the time to reach maximum secondary hardness at 1050 deg. F. is 6 min. with TM-3 and 1 hr. with TM-2.

The past several years have seen the modification of the standard high speed types with higher carbon and vanadium contents. This trend has reached its maximum to date in type TM-2 and results in abrasion resistance several times that of 0.70 per cent carbon 18-4-1. The increase in cutting efficiency with higher carbon and vanadium is now well established, but the applications must be selected with some caution due to the accompanying increase in grinding difficulty.

Recent modifications in molybdenum high speed steel compositions have followed the lines of

good logic. The reasoning has been somewhat in this vein: Let's admit the decarburization problems encountered with high molybdenum high speed steels. Therefore, why not decrease the molybdenum content to the point where these problems virtually disappear and add sufficient tungsten to obtain the necessary equivalency? Thus the introduction of the so-called 6-6, 6-5 and 5-4 types. When the molybdenum content is reduced to under about 5.5 per cent and replaced with between 5 and 6 per cent tungsten, the decarburization susceptibility is almost altogether eliminated in both manufacture and heat treatment. High speed steels of this composition, type TM-1, can be successfully heat treated without coating for nearly all types of tools in any type of heat treating equipment suitable for 18-4-1. Even in obsolete gas and oil fired furnaces without atmospheric control freedom from decarburization can be obtained by the use of an oxidizing preheat and a so-called slightly reducing super heat. The manufacture of high speed steels of this type is no more involved than the 18 per cent tungsten type and with these steels the Damocles sword of decarburization does not exist!

It has been difficult for consumers to comprehend the exact nature of molybdenum high speed steels, not only due to the many conflicting statements that have been made, but also because of the patent situation. Fortunately this has been considerably clarified by the procedure of the Climax Molybdenum Co., developer of the 6-6 type, which released data to all makers of high speed steel and did not apply for a patent. Also, the Allegheny Ludlum Steel Corp. has released a patent on the 5-4 type, and the Crucible Steel Co. of America and the Vanadium-Alloys Steel Co. have released their patents on the molybdenum-vanadium types. Thus the patent on the M-2 type is the only one on a molybdenum high speed steel of considerable production not available to producers and consumers without payment of royalty.

That tungsten-molybdenum and the molybdenum high speed steels can be satisfactorily used for almost all types of cutting tools is now well established. As to whether certain types are a little better or a little worse for specific applications is an endless discussion since

TABLE III

Molybdenum Steel Substitutes for Various Types of Tungsten High Speed Steels

18-4-1	TM-1
	M-1
	M-2
18-4-2	TM-1
	TM-2
	M-1
	M-3
	M-7
18-4-1 + 5 Co. 18-4-2 + 8 Co. 18-4-3 + 12 Co.	TM-2
	TM-3
	TM-4
	M-4
	M-5
	M-6

TABLE IV

Lattice Parameters*
All Carbides are Face Centered Cubic

Carbide (Fe, W, Mo),C	Type TM-2	Lattice Parameter A. U.
(Fe, Mo),C	Tungsten-Molybdenum Modified TM-3	11.05
(Fe, W),C	18-4-1	11.057

*From correspondence with Cohen and Lament of Massachusetts Institute of Technology.

the variables involved in most cutting operations are so complicated that it is often difficult to obtain re-producible results with a single type of high speed steel. It is significant that over a long period of years the 18-4-1 type has most closely approached this status of re-producibility or uniformity of results which likely accounts for its outstanding popularity. In this respect the tungsten-molybdenum steels of the TM-1 type containing nearly equal amounts of tungsten and molybdenum more nearly resemble 18-4-1.

One of the requirements of all high speed steels is red hardness. This term implies cutting hardness at red heat and is distinct from the room-temperature hardness that may be obtained after exposure to the red heat. A tool to be successful for a specific application must be hard at the temperature developed by the application. Thus while other factors are known to be involved, it is not surprising that a good approximation of cutting efficiency can be obtained from measurements of hardness at elevated temperatures. Both Herbert¹ and Boston², by using the cutting tool and the metal being machined as two elements of thermocouple have shown that temperatures of 1100 to 1250 deg. F. are obtained at the point of contact with moderate feeds and speeds. The temperature of 1200 deg. F. has been selected for hot hardness comparisons between the three most popular molybdenum high speed steels. For further comparison the hot hardness of 18-4-1 and 18-4-2 from Harder and Grove³ is included, the results shown in Table V. It is apparent that types M-1, M-2 and 18-4-1 have nearly identical hot hardness values with variations certainly within the experimental error of the method. It is equally apparent that the hot hardness of type TM-1 is considerably greater than that of the other two molybdenum types and compares favorably with 18-4-2. The probable reason for the higher hardness of TM-1 is the combination of an appreciable tungsten content with high vanadium.

There is little difference between the thermal conductivity of an 18 per cent tungsten and a tungsten-free 9 per cent molybdenum high speed steel. Some justifiable significance is attached to this property since a cutting tool with high conductivity would more quickly

TABLE V
Hardness at 1200 Deg. F.

Type	Quenching Temperature, Deg. F.	Drawing Temperature and Time, Deg. F.	Room Temperature Hardness, Rockwell C	Hot Hardness by Mutual Indentation at 1200 Deg. F.
TM-1	2260	1050 for 2½ hr.	65	342
M-1	2220	1020 for 2½ hr.	64.5	313
M-2	2220	1020 for 2½ hr.	65	308
18-4-1	2350	1075 for 2 hr.	64.2	312
18-4-2	2350	1075 for 2 hr.	65	344

dissipate the generated heat and thus reduce the temperature to which the tool is exposed. Table VI shows the thermal conductivity of heat treated 18-4-1 and Type M-1 over a temperature range of 400 deg. C. (752 deg. F.). These values were determined by the method developed by the U. S. Bureau of Standards and described in Research Papers 668 and 669. It is evident that the two types have approximately the same conductivity in the range observed and that the conductivity increases with increase in temperature.

The statistics on the production and importation of tungsten for the year 1941 do not indicate even a scarcity of tungsten this year for 18.00 per cent tungsten high speed steel. Should the worst fears be realized and all importations of tungsten stopped, there is still ample domestic tungsten production to satisfy the requirements for production of high speed steel in 1942 and 1943 of steel of the type of TM-1. A further factor of safety exists for ample tungsten for this type of steel when it is realized from 65 to 75 per cent of the scrap of the huge production of the 18.00 per cent tungsten steel of the present year will return to the producer for remelting. It is difficult to make estimates of the production of the different types of molybdenum high speed steels, as this information has not been compiled directly from the producers. The molybdenum-vanadium type, M-1, has increased greatly in production during the present year, while type TM-1 is increasing in production at such a

rapid rate that it appears that by early 1942 it will be produced in amounts larger than that for all other types of molybdenum high speed steels combined. Table I shows the three primary types of molybdenum high speed steel that are in general production. Table II shows the many variations in composition of high speed steels which are being commercially produced and Table III shows the suggested substitutional types for the most widely used types of tungsten steels.

It probably will be of interest to the readers to have available for reference the charts on tempering. These charts have been prepared by using the quenching temperature indicated and then tempering at the temperatures shown on the left for the tempering time shown on a logarithmic scale in hours at the bottom. These charts show the time necessary to hold the specimen to obtain maximum secondary hardness, as well as the time to obtain complete transformation using different tempering temperatures. The charts have been prepared under the supervision of Dr. Morris Cohen of Massachusetts Institute of Technology.

Bibliography

¹ E. G. Herbert, "Report on Hot Hardness Characteristics of Some Modern Tool Steels and Alloys," Mechanical Engineering, 1930.

² O. W. Boston, Private Communication to Harder and Grove.

³ Harder and Grove, "Hot Hardness of High Speed Steels and Related Alloys."

TABLE VI
Thermal Conductivity
Conductivity Watts Per Cm.² Per Cm. Per Deg. C.

Type	150 Deg. C.	200 Deg. C.	300 Deg. C.	400 deg. C.	500 Deg. C.	550 Deg. C.
M-1	0.203	0.210	0.223	0.236	0.249	0.256
18-4-1	0.209	0.214	0.226	0.239	0.251	0.258

The Measurement of

Residual Stresses in

DETERMINATION OF RESIDUAL STRESS DISTRIBUTION IN THIN WALLED TUBING: The stress distribution in thin walled tubing can be determined in a more quantitative manner by extending the simple splitting and slitting methods to samples from which successive surface layers have been removed by pickling or machining. The total distribution can be derived from sets of experiments in which either layers from the outside or the inside are removed. The pickling can be done either before or after the splitting. In the latter case a single specimen may serve for each set of experiments, while the former procedure requires a separate specimen for each measurement, or an approximate total of 15 to 25 specimens. However, the uniform pickling of one surface of a sample already split is difficult.

Such a procedure has been suggested by Fox⁶⁸ who, however, did not succeed in developing a proper mathematical procedure. The theory of this method has been worked out by Dawidenkow³, but his set of formulas appear to be unnecessarily complicated in consideration of the fact that certain arbitrary assumptions and resulting deviations are unavoidable.

Therefore, a comparatively simple set of equations has been worked out by Sachs and Espey⁶⁷ for calculating the circumferential and longitudinal stresses in tubing.

Circumferential Stresses

The following will be postulated: In Fig. 20 the thickness (x) removed, by pickling, from the original wall thickness (d) is positive in the direction of pickling. The change (ΔD) of the diameter (D) is positive if the specimen curves towards the direction of pickling, (D increases in the case of outside pickling, but decreases in the case of inside pickling). The total stress in the fiber (x) may be considered

as being relieved in three steps, yielding four stress components: S_1 , S_2 , S_3 , and S_4 .

The splitting operation relieves the previously derived stress component, Fig. 20-b:

$$S_1 = \frac{E}{1 - v^2} \cdot (d - 2x) \cdot \frac{\Delta D_1}{D_m^2}$$

where D_m is now a mean diameter, which is selected according to the later discussed considerations.

By removing a layer (x), two types of stresses are relieved. The component S_2 results from the release of the stresses in the removed layer, Fig. 20-c:

$$S_2 = \frac{1}{(d - x)} \int_x^d (S - S_1) dx = 0$$

The component S_3 originates in the same operation from the release of the bending moment resulting in the diameter change $\Delta D = \Delta D' - \Delta D_1$, where $\Delta D'$ is the diameter

change after splitting and subsequent pickling:

$$S_3 = \frac{E}{1 - v^2} (d - x) \frac{\Delta D}{D_m^2}$$

Eventually, the removal of a layer (dx), Fig. 20-d, relieves the stress S_4 , still retained in this layer, causing a deflection (dD). This deflection results from the removal of the bending moment (dM), according to the general relation:

$$dM = \frac{E}{1 - v^2} \cdot I \cdot \frac{2dD}{D_m^2}$$

The moment of inertia of the strip of the thickness $d-x$ and unit width is:

$$I = \frac{(d - x)^3}{12}$$

Therefore:

$$dM = \frac{E}{1 - v^2} \cdot \frac{(d - x)^3}{6} \cdot \frac{dD}{D_m^2}$$

and also:

$$dM = -S_4 \cdot dx \cdot \frac{(d - x)}{2}$$

FIG. 20—Diagrammatic representation of stepwise relief of component stresses with splitting and pickling of a circumferential section.

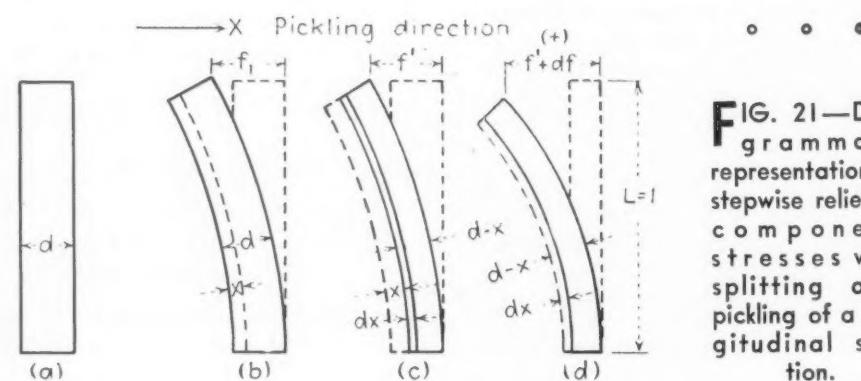
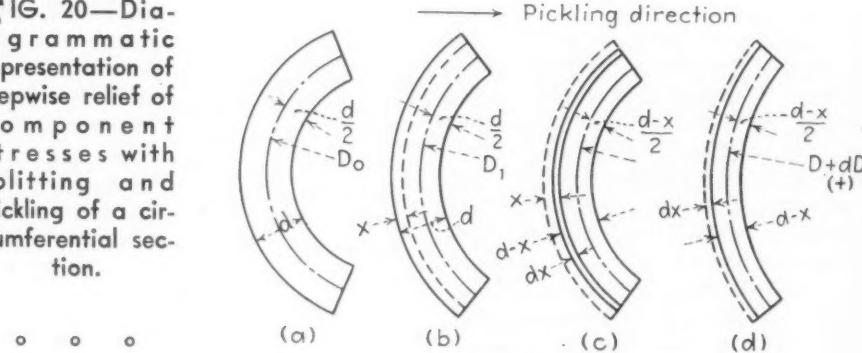


FIG. 21—Diagrammatic representation of stepwise relief of component stresses with splitting and pickling of a longitudinal section.

S in Metal

Therefore, eventually:

$$S_t = - \frac{E}{1-v^2} \cdot \frac{(d-x)^2}{3D_m^2} \cdot \frac{dD}{dx}$$

Thus, the total stress becomes:

$$\begin{aligned} S &= \frac{E}{1-v^2} \cdot (d-2x) \cdot \frac{\Delta D}{D_m^2} \\ &+ \frac{E}{1-v^2} \cdot (d-x) \cdot \frac{\Delta D}{D_m^2} \\ &- \frac{E}{1-v^2} \cdot \frac{(d-x)^2}{3D_m^2} \cdot \frac{dD}{dx} \\ &- \frac{1}{d-x} \int_0^x (S-S_t) dx \end{aligned}$$

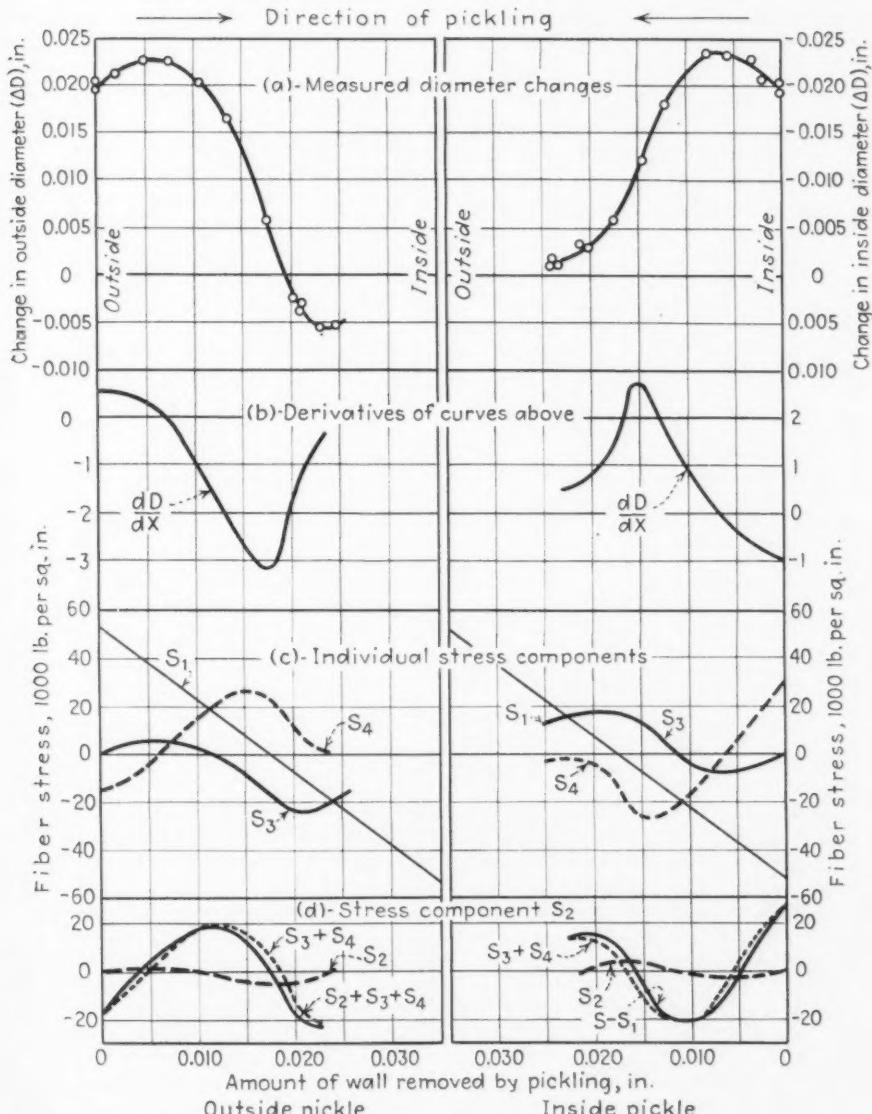


FIG. 22—Steps in determination of stress distribution in sunk cartridge brass tubing.

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Cleveland

Completing this abstract on residual stresses in metals, the authors discuss the determination of stresses in thin walled tubing, drawn and spun cups, and discuss some theoretical investigations made on residual stresses.

The mean diameter (D_m) used in the above equations varies considerably depending upon the diameter changes occurring and also upon the decrease in wall thickness during pickling. Usually a selected

constant value of D , somewhere between the inside and the outside diameter of the tube, can be used without greatly impairing the accuracy of the results. The stress component S_t may be disregarded in many practical cases as it often contributes only a small part to the final stress as in Figs. 22 and 23.

Fundamentally, the same derivation of formulas apply to the longitudinal stresses, Fig. 21, after replacing $E/(1-v^2)$ by E , and $\frac{\Delta D}{D_m^2}$ by f .

This results in the final equation:

$$S = E(d-2x)f_1 + E(d-x) \cdot f - \frac{E(d-x)^2}{3} \frac{df}{dx} - \frac{1}{d-x} \int_0^x (S-S_t) dx$$

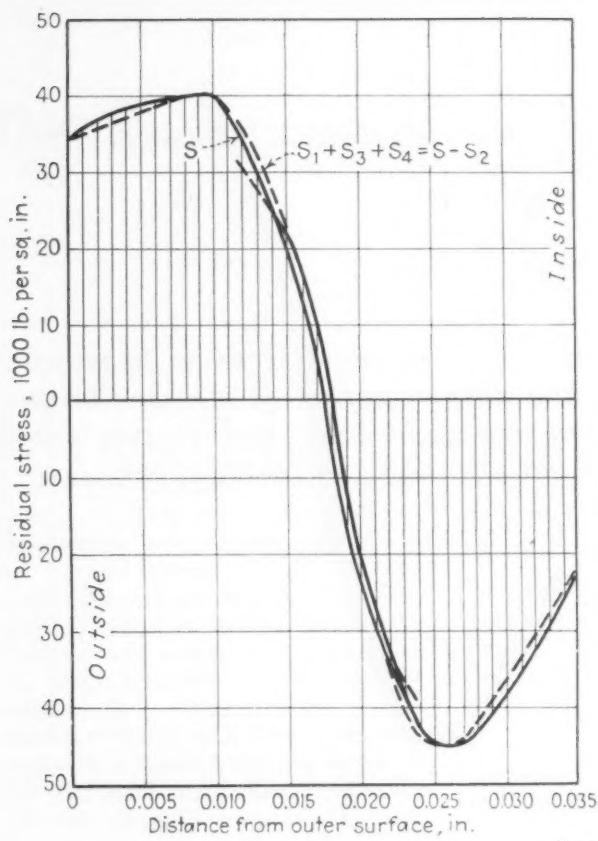
Where,

S = longitudinal stress at x ,
 x = the amount of wall removed (by pickling)
 f_1 = the unit deflection after slitting.
 f' = the unit deflection after pickling and subsequent slitting,
 $f = f' - f_1$,
 E = the modulus of elasticity,
 d = the original wall thickness,
 $S_t = E(d-2x)f_1$.

The deflections are positive if the tongue curves in the direction of pickling (+ x), Fig. 21.

The same equation also applies to the stress distribution in a plate or strip, where the original deflection is equal to zero ($f_1 = 0$). The resulting equations are simpler than other solutions previously reported for this problem⁴².

A set of curves, illustrating the procedure for determining both the circumferential and the longitudinal stresses in a sunk (drawn without inside mandrel) 70-30 brass tubing, is shown in Figs. 22 and 23 and for a heat treated SAE X-4130



LEFT

FIG. 23—Distribution of residual circumferential stress in brass tubing 0.500 in. o.d., 0.0345 in. wall thickness, sunk from 0.625 in. o.d., through a 12.5 degree half-angle chromium plated die.

• • •

BELOW

FIG. 24—Steps in determination of stress distribution in oil quenched SAE X-4130 tubing.

steel tubing, shown in Figs. 24 and 25. The total stress distribution is obtained from two sets of experiments using outside and inside pickling. For determining the differential coefficients, the trend curves through the experimental points are used, and the values thus obtained again corrected by means of trend curves. These values are not more accurate than ± 25 per cent, because of the fundamental increase of experimental scattering by the operation of differentiating. Considering the fact that several sources of stress losses exist which cannot be properly evaluated, the final values as determined are probably somewhere between 0 and 25 per cent lower than the actual values.

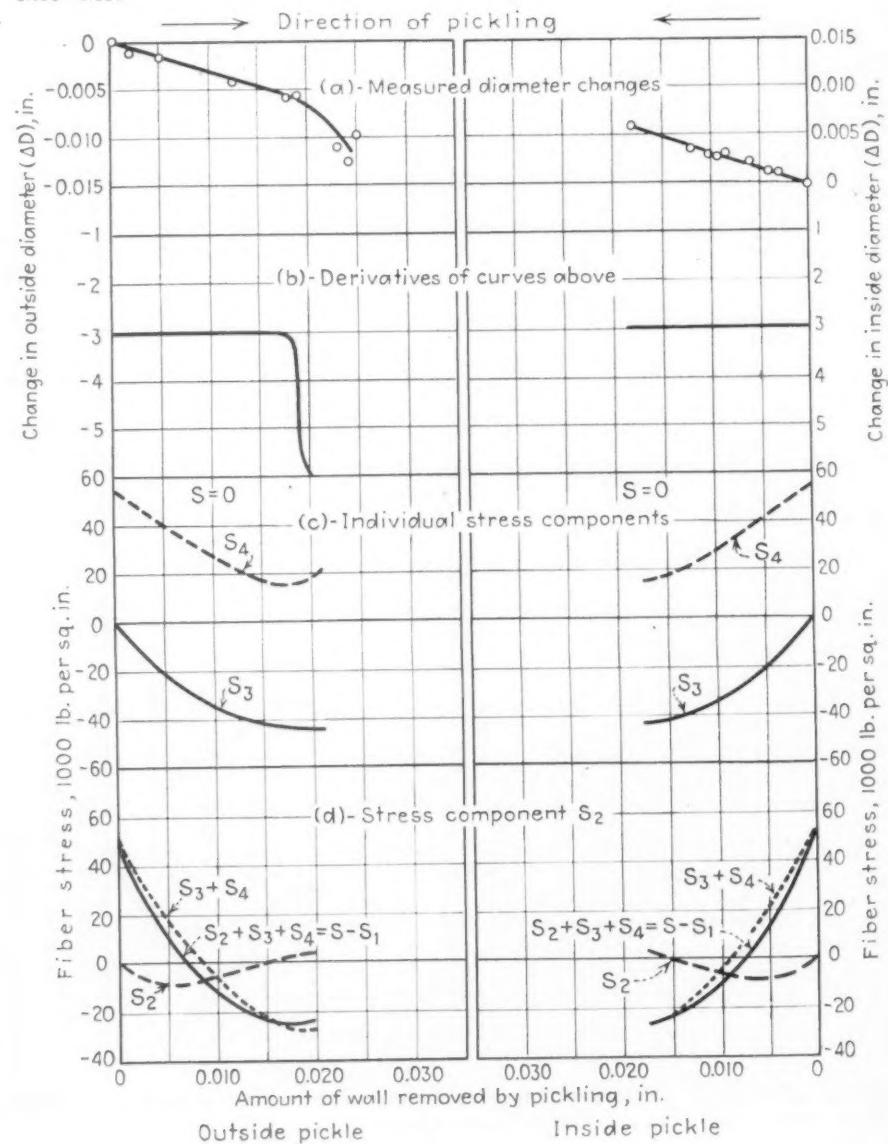
Drawn and Spun Cups

Some attempts have been made to determine the residual stresses present in drawn and sunk cups. Hatfield and Thirkell¹⁰ introduced their method of splitting rings for the evaluation of the circumferential stresses in the various parts of the wall of sunk cups. Further measurements of this type have been carried out by Moore, Beckinsale and Mallinson¹¹. Grimston¹² bored the interior of a drawn cartridge case, leaving one-quarter of the wall at

a point midway between the bottom and edge. The change in diameter caused by this operation is a certain measure of the stress relieved in the remaining wall. Cutting a longitudinal strip and measuring the deflection yields an average value for the longitudinal stress. However, these methods are quite insufficient to reveal the real magnitude and the distribution of the stresses in cups.

A cup is basically assembled of a sequence of narrow layers of differently strained thin-walled tubes. Thus, the residual stresses consist of a portion corresponding to those in uniform tubing and another portion originating from the mutual effect of the various layers.

The longitudinal stress can be theoretically determined from the deflection of a longitudinally cut tongue, Fig. 26-a. If (*f*) is the deflection of the tongue at a point of distance (*x*) apart from the bottom there exists the following equation



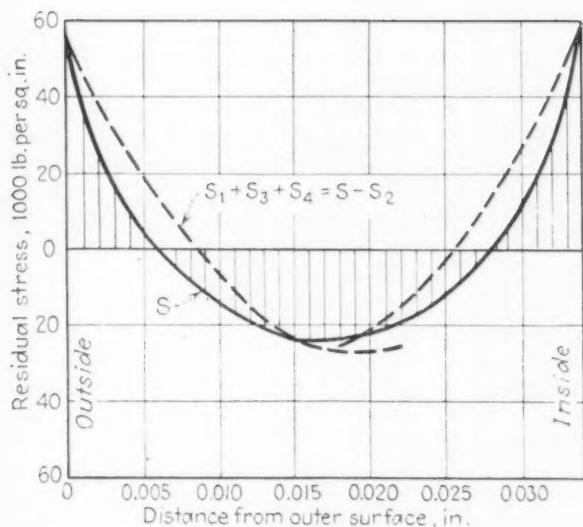


FIG. 25—Distribution of residual circumferential stress in SAE X-4130 tubing, 0.875 in. o.d., 0.034 in. wall thickness, oil quenched from 1550 deg. F.

for the bending moment (M) at this point, released by the cutting operation:

$$M = \frac{EI}{R} = EI \cdot \frac{df}{dx^2}$$

Where E = the elastic modulus, I = the moment of inertia of the cross section, and R = the radius of curvature at the point x . Assuming a linear stress distribution, the released surface stress (S_{max}) is:

$$S_{max} = \frac{M}{C} = E \frac{I}{C} \frac{df}{dx^2}$$

where C is the section modulus. For a rectangular cross-section of the thickness (d) this becomes, when $I/C = d/2$:

$$S_{max} = E \frac{d}{2} \cdot \frac{df}{dx^2}$$

The determination of the longitudinal stress therefore involves very accurate measurements of the deflection (f) or of the contour of the bent tongue. Carrying out two stages of differentiation increases considerably any experimental error. A similar method consists of carrying out the sawing operations in steps, Fig. 26-b, to a depth (x') and yielding the deflection (f'), determining an average released bending moment (M'):

$$M' = \int \frac{Md\bar{x}}{\bar{x}} = EI \cdot \frac{f'}{x'^2}$$

From the curve $f' vs. x'$, the bending moment at the point (x):

$$M = \frac{dM'}{dx} \cdot x = \frac{EI}{x} \cdot \frac{df'}{dx}$$

can be obtained by a single stage differentiation.

The determination of the circumferential stress affords two steps,

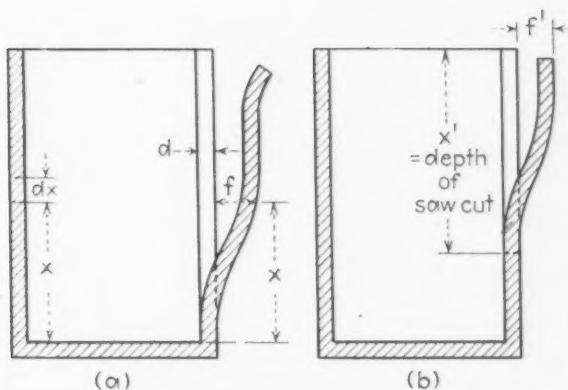


FIG. 26—Diagrammatic representation of methods for determining longitudinal stress in a cup.

which have been revealed by Swift¹¹ and substantiated by some experiments. The first step is the previously discussed cutting of the cup wall in rings and slitting of these rings. This yields that portion of the longitudinal stresses (S_1) which are in equilibrium over the cross-section of ring. The other portion or a uniformly distributed tension

or compression stress (S_2) results from the mutual effect of different layers. This effect consists of a radial shear stress (t) on any cylindrical section perpendicular to the axis having the distance (x) from the bottom of the cup. This shear stress (S) is determined by the change (dM) of the longitudinal moment (M) on moving longitudinally

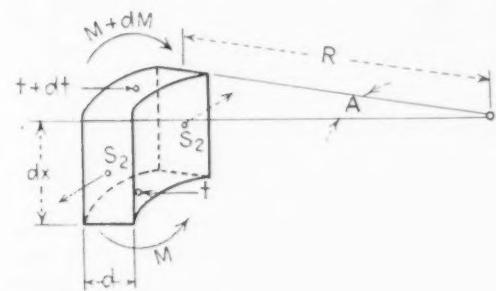


FIG. 27—Relation between moments and stresses acting on a wall section of a shell.

FIG. 28—The residual stress developed in cast iron test frames composed of members of different diameters. (V. Steiger)

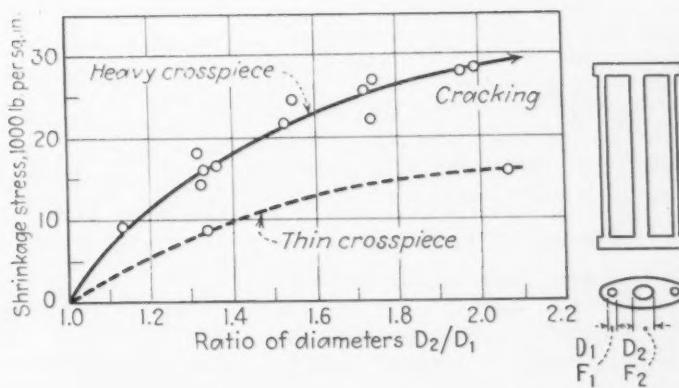
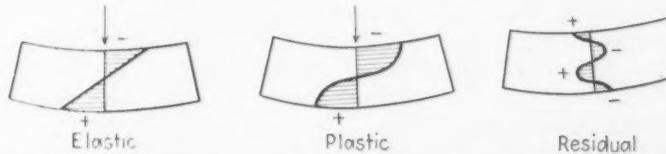


FIG. 29—Development and distribution of residual stresses in bending.



nally a distance (dx), as illustrated in Fig. 27:

$$\begin{aligned} M + dM - M + t \cdot d \cdot R \cdot A &= 0 \\ t &= -\frac{1}{R \cdot A \cdot d} \cdot \frac{dM}{dx} \\ &= -\frac{EI}{R \cdot A \cdot d} \cdot \frac{d^3f}{dx^3} \\ &= -\frac{E \cdot d^2}{12} \cdot \frac{d^4f}{dx^4} \end{aligned}$$

where d = the wall thickness, R = half of the diameter of the cup. A = angle width of the cross-section, and $I = \frac{R \cdot A \cdot d^3}{12}$, the moment of inertia. In turn, the second portion of the circumferential stress is

the residual stresses introduced by stress-creating processes such as casting⁷⁴, welding⁷⁵, quenching, and mechanical working⁷⁶.

A fairly complete analysis has been made of the casting stresses^{75, 76} formed in a cast iron frame consisting of two rods of a relatively small diameter (D_1) or cross-section (F_1) on the outside and a rod of larger diameter (D_2) or cross-section (F_2) in the center connected by a crosspiece, Fig. 28. A uniform thermal contraction without any complications introduced by phase transformations is assumed. The residual stresses were found to

It has been particularly attempted to calculate the residual stresses originating from various welding processes and from local heating⁷⁷. Very few investigators^{78, 79} have taken into account the plastic flow in welding which is known always to occur and exert a large effort on the residual stresses.

Residual stresses may also originate directly from a non-uniform cold-working process, while a uniform plastic flow such as created by tension does not create any residual stress⁸⁰. The distribution and magnitude of these strain-hardening stresses can be calculated in a satisfactory although approximate manner only for a few simple cases such as bending⁸¹, torsion⁸², expanding of tubes (or "autofrettage"), Fig. 31^{83, 84, 85}, and rotation of disks^{86, 87}. The residual stresses, present after unloading, can be determined from the generalization that they represent the difference between the acting stresses during plastic flow under load and of a purely elastic condition (representing unloading) corresponding to the same load, no external forces or moments being retained. This principle is illustrated for bending in Fig. 29 and for expanding a tube in Fig. 31. In Fig. 30 is shown the stress distribution which has been experimentally determined in a bent steel strip⁸⁸.

However, most working processes are very complicated and their stress-strain relations are not known well enough to permit calculation of the resulting residual stresses. A specific process, such as wire or deep drawing, may be more or less uniform and large or small residual stresses may originate, depending upon the shape of the tools and other features of the working process⁸⁹. Working at sufficiently high temperatures followed by slow cooling does not create any appreciable residual stress, due to the spontaneous relieving of stresses by internal plastic flow at the working temperature.

Further types of residual stresses which are of metallurgical interest are the stresses developed by shrinking⁹⁰ two or three-piece dies (inserted dies), extrusion cylinders⁹¹ and gun barrels^{92, 93}, and the stresses present in articles made up of two metals with different expansion coefficients (bimetals).

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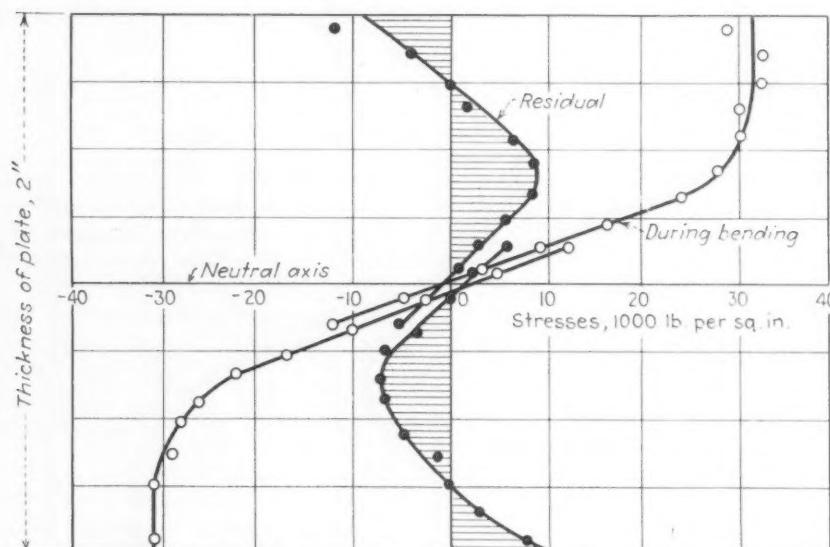


Fig. 30—Load stresses and residual stresses in a bent steel strip.
(Dawidenkov and Shevandin)

in equilibrium with the shear stresses:

$$S_2 \cdot d \cdot dx \cdot A + (t + dt - t) d \cdot A \cdot R = 0$$

$$S_2 = \frac{dt}{dx} = \frac{E \cdot d^2 \cdot R}{12} \cdot \frac{d^4 f}{dx^4}$$

Thus, the second portion (S_2) of the circumferential stress is to be determined by four stages of differentiation from the longitudinal deflection (f_x), any errors being magnified enormously.

Theoretical Investigations

A large number of publications^{72, 73} deal with the fundamental equilibrium relations which govern the distribution of residual stresses stored in elastic bodies. So far, these investigations have been found to have little application in the metal industry, and the metallurgical engineer is often forced to disregard the theoretical relations in order to develop a practical stress measurement method. A few successful attempts have been made to calculate

be theoretically dependent on the ratio of the cross-sections of the rods. At a ratio D_2/D_1 of about 2, tensile stresses of approximately 30,000 lb. per sq. in. are obtained in the thick member, Fig. 28, these being sufficient to cause rupture during cooling. The residual stress was determined by machining layers from the surface of the thick member until fracture occurred at a certain cross-section (F):

$$S = \frac{F}{F_2} \cdot S_b$$

where S_b is the tensile strength of the cast iron. Experiments of a similar type have also been made for spoked wheels⁷⁷ and for cylindrical specimens⁷⁸.

Some calculations have been carried out regarding the stresses retained in cast or heat-treated steel cylinders and pipes⁷⁹. However, there is some doubt as to the validity of the assumptions on which these deductions are based.

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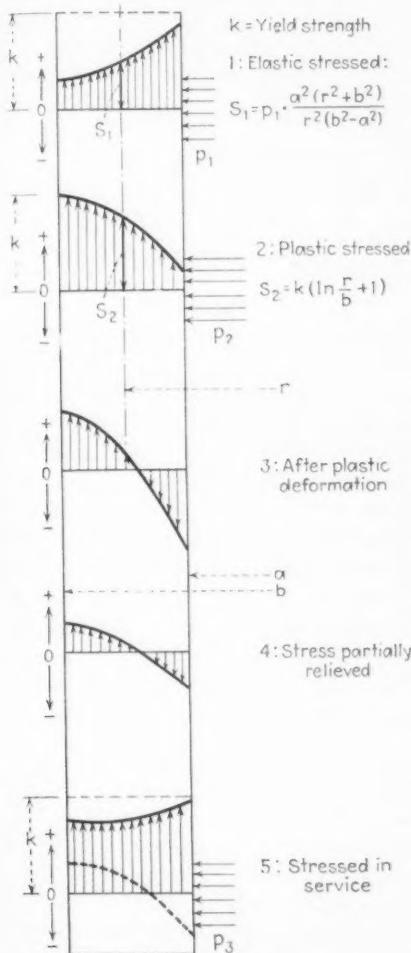


FIG. 31—The stresses produced during different stages of auto-frettage and during service of gun barrels.

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Machine Vibrations Isolated by Rubber

INSULATION of machine tools against vibration has been materially improved by the new Vibro-Insulators brought out by the B. F. Goodrich Co., Akron, Ohio. These devices are made of metal and rubber and it is claimed that they assist greatly in increasing the accuracy of machine tool operation. One recent successful installation has been on machines in the Allison engine division of Cadillac at Detroit. Before the insulators were used, all machines having excessive vibration had to be installed on the first floor and away from precision equipment, such as grinders and

precision boring machines. To-day, broaching machines equipped with Vibro-Insulators have been located near finish grinders with no effect on the finishes obtained, according to H. T. Johnson, superintendent of the methods and equipment division of Cadillac.

Aside from the machine tool insulators mentioned above, Goodrich has recently introduced several other new types of Vibro-Insulators for specific applications. No. 44 for use with gas burners is furnished with rubber in shear or in compression. The maximum load in shear is 10 lb., in compression 50 lb.

Deflection at these loads is 5/32 and 1/8 in. respectively and minimum disturbing frequency at 5/32 in. deflection is 1200 and 1350 cycles per min. respectively. No. 50 for use with internal combustion engines will take care of minimum disturbing frequencies from 1200 per min. on and is made in a variety of hardnesses. No. 60, to insulate the vibration of exhaust and intake fans, consists of a compression mounting for lowest frequencies from 1000 per min. with a maximum load of 240 lb. and 3/16 in. deflection at this loading.

An Improved Tin Foil

INVESTIGATIONS on improving "non-toxic" tin foil for food wrapping and for milk bottle tops, have been reported in the July issue of *Tin and Its Uses*, where it is indicated that a foil of great strength, reasonable ductility, and the ability to take a set around an object and not spring away has been developed from a tin-nickel-zinc alloy. While original investigations were made on tin-zinc alloys, further developments proved that 0.15 per cent nickel and 8.5 per cent zinc additions to tin, gave a new

alloy that is easy to cast and roll, and has excellent tensile strength and elongation, as shown in the accompanying table.

The mechanical properties of this new tin foil were tested from pieces cut from a strip of the material about 0.0016 in. thick, and a special testing machine was devised for the tests. The loading was increased at a constant rate, and as the tensile values obtained for materials of this type vary considerably with the speed of testing, the results are comparative rather than absolute

strengths. However, with the instrument used, the results have been shown to be closely reproducible.

A remarkable feature of this new nickel-zinc-tin alloy is that its composition closely approximates a "eutectic," and the constituents are so arranged as to give a particularly uniform, finely divided structure, which contributes to its ease of casting and rolling and to its freedom from corrosion.

Corrosion tests revealed that even when milk was allowed to sour, the amount of metal absorbed from the cap made of this alloy was negligible, obviating the necessity of a lacquer coating for additional protection. Samples of the foil made by a commercial foil manufacturer were tried out by a dairy in their bottle capping machines and found to be entirely satisfactory.

Foil Composition

Pure tin	2,000
Pure zinc	15,000
Tin + 8 per cent zinc	8,000
Tin + 8.5 per cent zinc and 0.15 per cent nickel	10,000

	Tensile Strength, Lb. Per Sq. In.	Elongation, Per Cent
Pure tin	2,000	6.5
Pure zinc	15,000	10
Tin + 8 per cent zinc	8,000	21
Tin + 8.5 per cent zinc and 0.15 per cent nickel	10,000	46

Rectifiers for Electroplating

By ADOLPH BREGMAN
Consulting Engineer, New York

—In the past two weeks the author has discussed the theory and practice of rectifiers, and the types and makes of equipment available. Herein, in conclusion, data are given on the efficiency, voltage regulation, power, maintenance, etc., for rectifiers and for motor-generators.

AN interesting discussion appeared recently on the comparative merits of rectifiers and motor generator sets, which is given in abstract below. Obviously to get the whole story, *both sides* must be read.

For fair comparisons a detailed study of the performance of rectifiers and motor-generators should include the factors of efficiency, voltage regulation, power factor, maintenance costs, space and installation limitations, and effects of age.

Advantages of Generators

(1) The maintenance of uniform current conditions depends entirely upon the maintenance of constant voltage at all times and under changing loads. Constant voltage is, therefore, of utmost importance for electroplating which requires uniform current conditions. The rectifier varies as much as 25 per cent at rated voltage and almost 60 per cent at two-third rated voltage, from no-load to full load in amperes. Motor-generators vary only 3 per cent plus or minus, from the

rated voltage on fixed field setting, and also keep within the same close limits at voltage values between 75 and 110 per cent of rated voltage.

In some instances, the quality of the plate is dependent upon fine control of the voltage. The field rheostat of the motor-generator set will provide as many as five intermediate steps between $\frac{1}{2}$ -volt values or 10 steps to the volt.

(2) Since the rectifier is based on the valve action of current passing through the contact of two plates under pressure, definite changes are likely to take place with age, the rectifier efficiency gradually decreases, variations of load become greater, and input voltage must be stepped up to maintain rated output.

(3) The cost of maintaining motor-generator sets resides mainly in the cost of brush replacement and commutator treatment. This may be estimated, on the average, at less than \$100 per year for a 5000 amp., 8 volt generator—a very small item. If properly maintained, the motor-generator set does not deteriorate with age.

(4) Motor-generator sets are known for their ability to carry continuous overloads safely. The rectifier cannot be overloaded without

excessive temperature and consequent breaking down of the film on the plates which produce the rectification.

(5) The rectifier operates at lagging power factor, less desirable than leading power factor, which can be obtained with the motor-generator set, using the synchronous motor. Lagging power factor is penalized by power companies. Unity power factor is available in motor-generators at no extra cost in most commercial sizes of generators, and leading power factor motors can be obtained at slightly higher cost.

Advantages of Rectifiers⁸

(1) The copper oxide rectifier has been in use for nearly 15 years, and many thousands have been placed in industrial applications where long life and reliability are essential. For example, several thousand battery chargers have been in continuous operation for 8 to 10 years without repair or maintenance.

The plate type rectifier for electroplating has been in service abroad for about eight years and in the United States for about four years. A gradual increase in forward resistance occurs with time,



FIG. 17—This
9000-amp. copper
oxide rectifier
installation con-
sists of 30 units,
300 amp. each.

(Courtesy, General
Electric Co.)

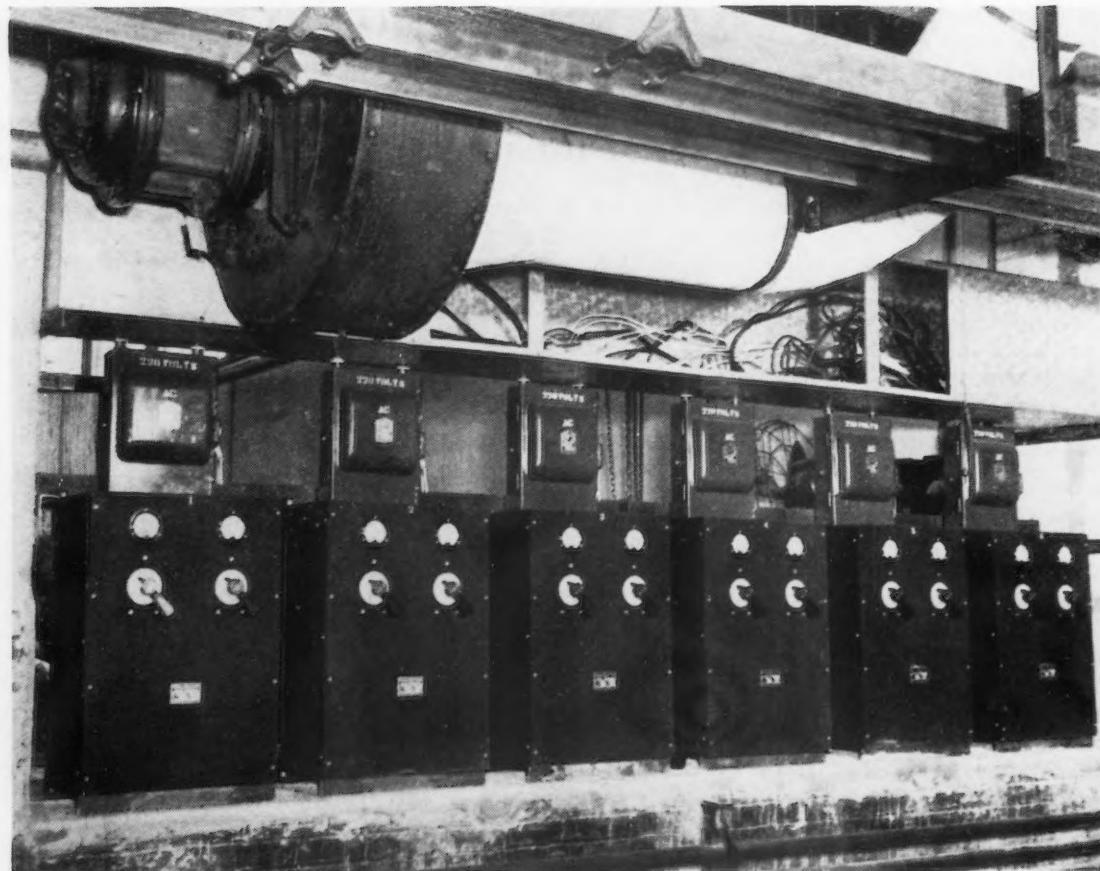
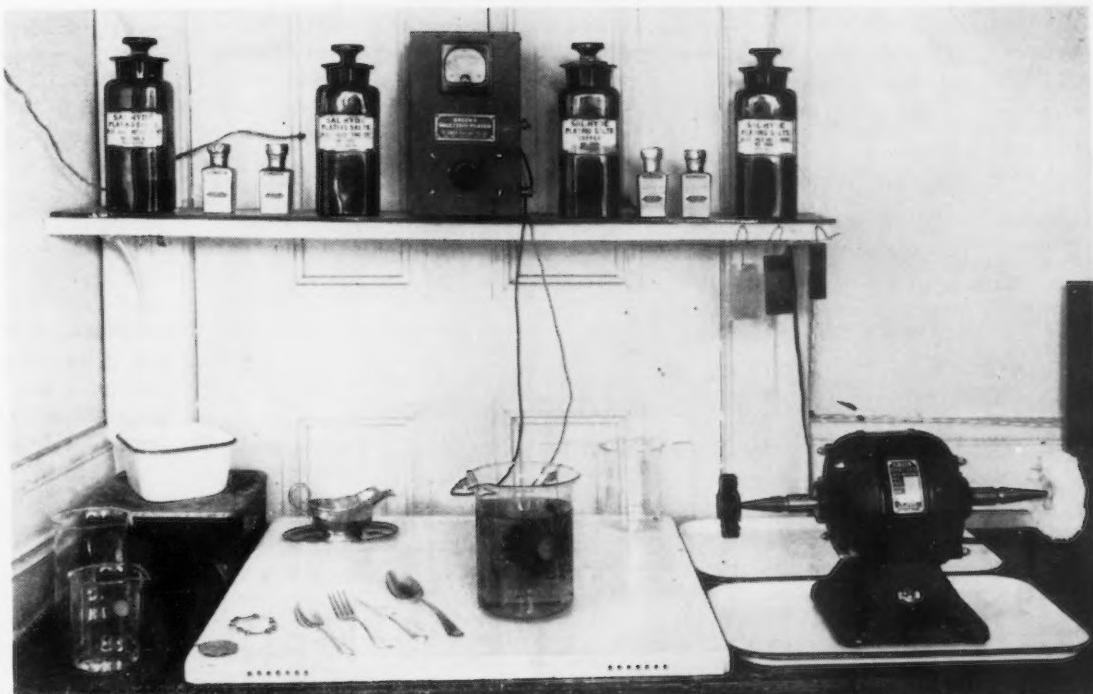


FIG. 18—"On-
load" voltage
regulators for 9000
amp. installation
shown in Fig. 17.

(Courtesy, General
Electric Co.)

FIG. 19—A small selenium rectifier installation, 4 amp., 6 volts, for bench work, laboratory work, and small jewelry work.

(Courtesy, W. Green Electric Co.)



causing a slight reduction in efficiency, but this does not mean failure of the rectifier. It simply means using another tap to obtain a certain output.

(2) Most of the aging change occurs during the first year of operation, with very small changes thereafter as shown by tests over 10 years. No change whatever in output is noted for the second five years of operation. Properly designed rectifiers include full provision for the aging factor.

(3) Full load efficiency of large synchronous motor-driven generator sets is higher than that of rectifiers, but the efficiency of rectifiers at the tank is higher because rectifiers can be set near the tank and bus-bar losses are reduced or eliminated.

(4) The rectifier can be turned on and off like a light, eliminating all no-load losses, whereas motor-generator sets are almost always left running, with considerable waste of power during the no-load or light load periods.

(5) Voltage adjustment of the rectifier by means of changing transformer taps eliminates the tank rheostats which are very wasteful of power.

(6) Efficient operation is obtained from the rectifier at all voltages.

(7) The rectifier efficiency is not

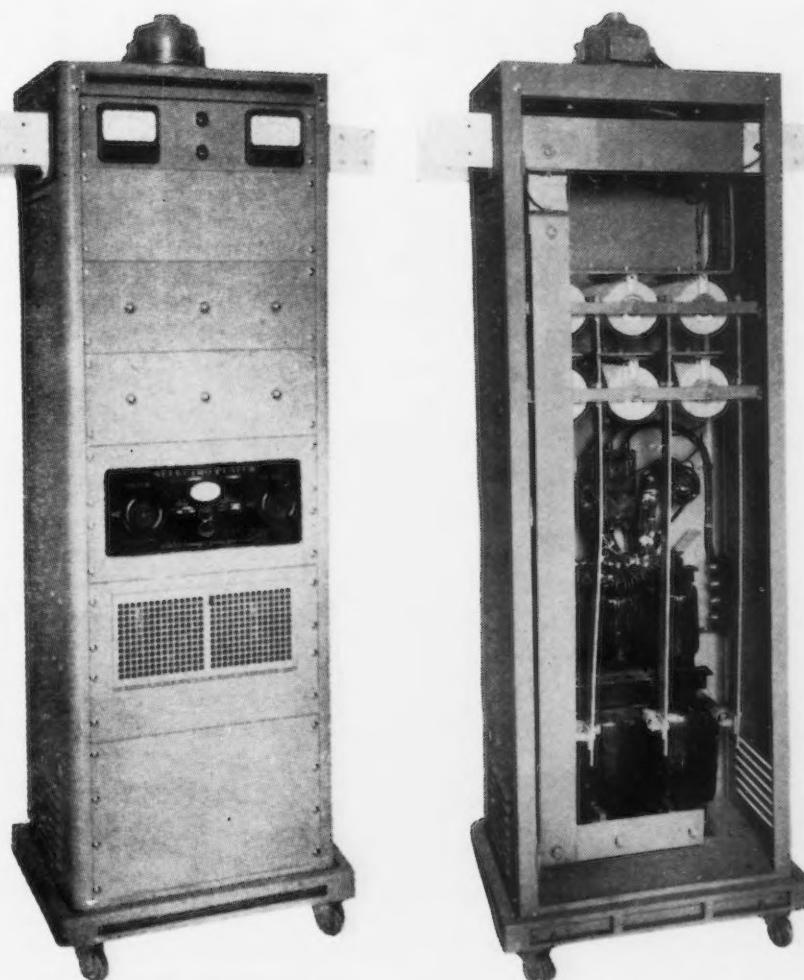


FIG. 20—Selenium rectifier, front view, 1500 amp., 6 volts; weight, 1050 lb.; dimensions, 22 x 18 x 68 in.

(Courtesy, W. Green Electric Co.)

FIG. 21—Selenium rectifier, rear view, 1000 amp., 6 volts. Weight, 750 lb.; dimensions, 22 x 16½ x 66½ in.

(Courtesy, W. Green Electric Co.)

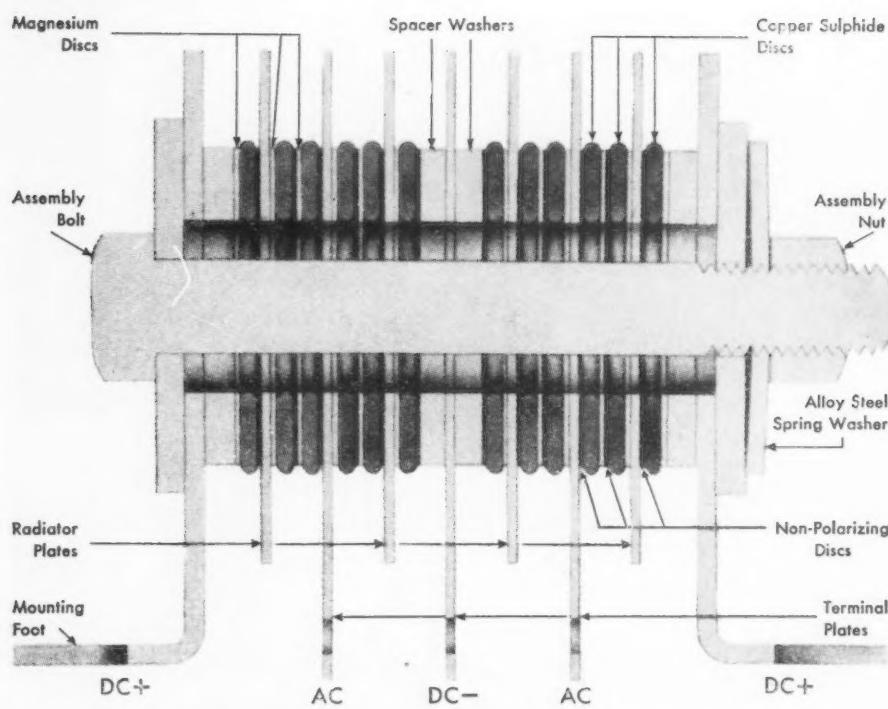


Fig. 22—Cutaway of magnesium-copper sulphide rectifier.

greatly reduced after a year's operation. One example, a 6-volt, 2000-amp. rectifier showed 72 per cent efficiency when installed, and after 14 months maintained the same record.

(8) Voltage regulation is around 30 per cent for the copper-oxide rectifier and for that reason improper applications must be avoided. If several tanks are being operated

with varying loads, a rectifier should not be used if the voltage must be held within close limits. If the voltages are not critical, or if a rectifier can be installed for each tank, rectifiers can be advantageously used.

(9) If some trouble should occur in the rectifier, the section which has failed can be cut out and operation continued on the remainder. In

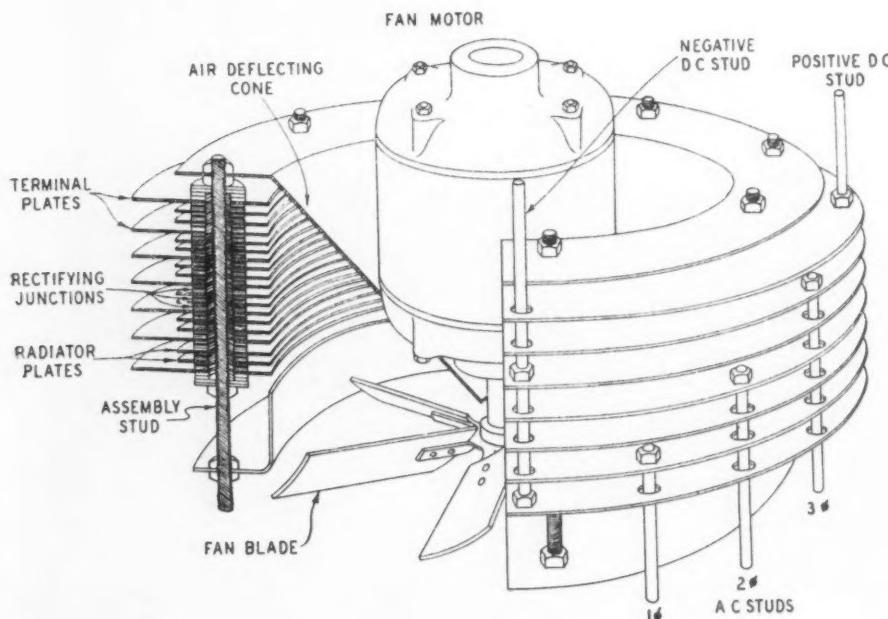


FIG. 23—Cutaway view of d. c. power dome and ring type rectifier as used in magnesium-copper sulphide rectifier.

the same way, connectors to the individual plates are such that if a single plate should fail for any reason at all, it is automatically eliminated from the circuit without interrupting the operation of the rectifier but simply by the burning out of its connector.

(10) Over-loading a copper oxide rectifier is not recommended but some makes are guaranteed for the same over-load in amperes as standard generators. Rectifier units are designed and rated for operation with normal ventilation at about 10 deg., C. rise, when self-cooled. Fan-cooled units for electroplating are operated with about 6 deg., C. rise. Permanent current over-loads will not cause immediate failure, but simply increase the temperature rise which will increase the rate of aging of the rectifier elements. Over-load for a few hours will have no effect.

(11) Over-loads are permissible only in current—not voltage.

(12) Rectifiers should be protected from excessively corrosive atmospheres by a coat of varnish or enamel. It is sometimes best to have the rectifier elements set in a cubicle outside the plating room where they can be fed by the blower with clean air for ventilation. If it is necessary to set them in the plating room, clean ventilating air can be brought in by ducts. Rectifying elements installed outside of the plating room, with a separate operator's control cabinet set near the tank, require no special attention.

Later comments from the pro-selenium rectifier side¹⁰ include the following:

Referring to paragraph 3, Advantage of Generators: in neither the copper oxide nor the selenium rectifier does the current pass through the plates under pressure, nor does the rectifier efficiency continue to decrease.

Paragraph 5: Advantages of Generators. Selenium rectifiers are guaranteed for 25 per cent overload, continuously.

Paragraph 6: Advantages of Generators. Selenium and copper oxide rectifiers have a power factor of above 90 per cent. This power factor is not penalized.

An answer from the magnesium-copper sulphide rectifier side¹⁰ is summarized as follows:

Considered only as a source of D.C. power, the motor-generator set exhibits certain advantages over

magnesium-copper sulphide rectifiers in respect to voltage regulation, power factor and efficiency while the rectifier maintains an advantage in flexibility, low cost, light weight, compactness and freedom from maintenance.

Consideration of either one, however, in combination with the other necessary equipment, makes the comparison more favorable to rectifiers. It should also be noted in this respect that a rectifier installa-

While custom-built rectifiers have certain control advantages a careful survey indicated that the great bulk of plating work could be handled by either a 6 or 12 volt supply of sufficient capacity to handle common types of barrels, plating tanks and cleaners. This type of rectifier was developed by P. R. Mallory & Co., Inc., in conjunction with the Udylite Corp., and standardization on this single style and rating has produced a compact sup-

lower than that of motor-generators.

Bibliography

¹ "X-Ray Study of the Structure of Rectifying Selenium Films," by G. L. Clark and P. G. Roach. Preprint 79-22, Electrochemical Society. A paper presented at the 79th general meeting at Cleveland, April 16-19, 1941.

² "Copper Oxide Rectifiers for Electrochemical Uses," by I. R. Smith. Metal Cleaning and Finishing, January, 1938.

³ "The Plate Type Copper Oxide Rectifier," by Clarence E. Berger. Metal Industry, August, 1938, p. 382.

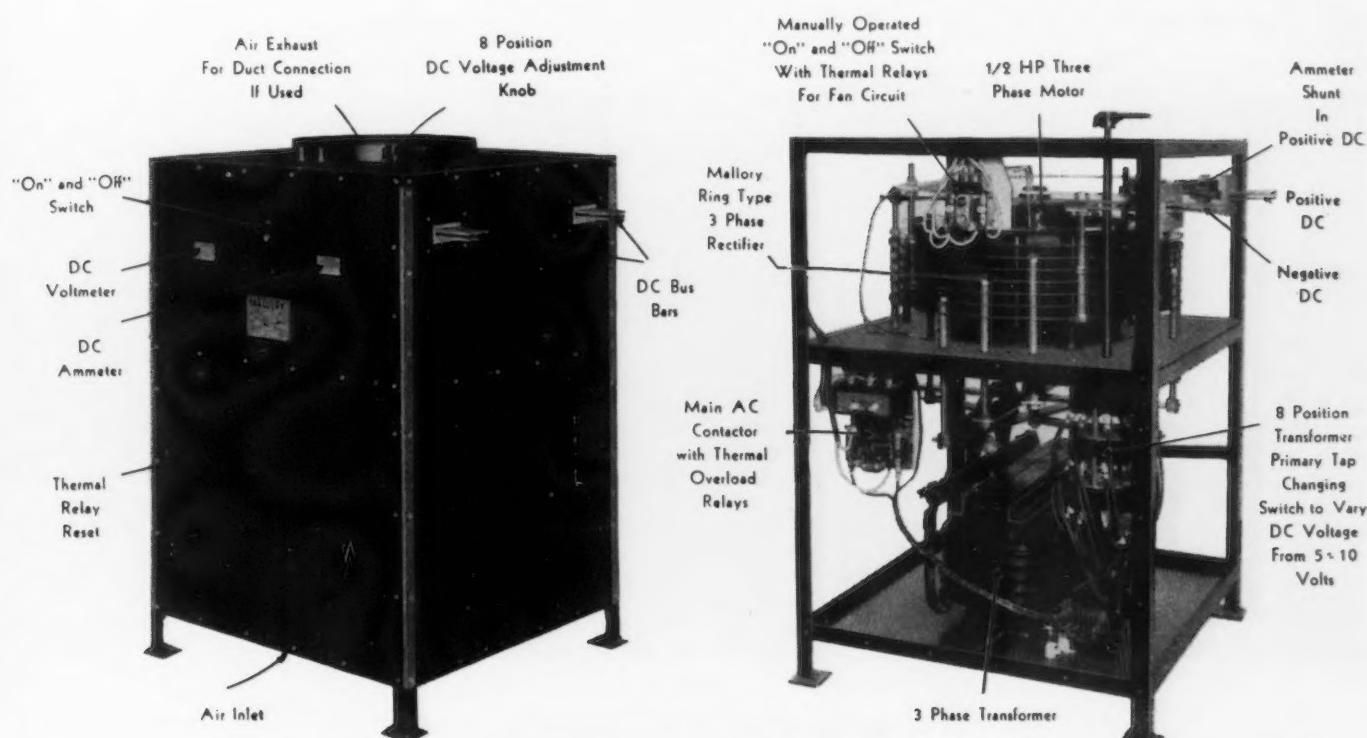


FIG. 24—Magnesium-copper sulphide rectifier for 460 volt, 60-cycle, three-phase rated output 8 volts, 1000 amp. Maximum output 10 volts, 1200 amp. Weight, 1000 lb., dimensions, 32 in. x 32 x 44 in.

tion should consist of numerous small separate units while motor-generator installations of equivalent capacity would be concentrated in a minimum number of large-amperage units. This permits the independent operation of separate units with rectifier supply and does not require the close voltage regulation with load that is necessary where several units are supplied by a single motor-generator. The rectifier voltage variation of 15 per cent between no load and full load is quite satisfactory under these separate load conditions.

The power factor of the magnesium-copper sulphide rectifier is 96 to 98 per cent or sufficiently close to unity for most purposes.

ply of outstandingly low cost.

With a cost of approximately 50c. per amp. rating at six volts and load units of 1440 amp., this type of rectifier has a further advantage in permitting the shop operator to economically increase his facilities gradually rather than by the large and relatively inflexible increases required in motor-generator supply.

On the basis of life records of magnesium-copper sulphide rectifier plating units over years of satisfactory service, and taking into consideration comparative costs of total units and rectifier components, the combined maintenance and depreciation cost per ampere per year of magnesium-copper sulphide rectifier supplies would appear to be

⁴ "Metal Rectifiers to Supply Current for Plating," by A. Smart. Metal Industry, July, 1936.

⁵ "Rectifiers Allow Power Flexibility," by L. W. Reinken. Metal Finishing, February, 1941.

⁶ Private communication from L. E. Eckermann, manager, Metal Finishing Division, Pyrene Manufacturing Co.

⁷ "Metal Rectifiers and Motor Generator Sets for Electroplating," by G. J. Berry, and discussion by I. R. Smith. Monthly Review of the American Electrochemical Society, April, 1941.

⁸ In this instance the proponent, I. R. Smith, referred specifically to copper oxide rectifiers, although many of his points are equally applicable to other types.

⁹ Private communication from L. W. Reinken, W. Green Electric Co.

¹⁰ Private communication from Leon Robin, P. R. Mallory & Co.

¹¹ From "Electroplating," by Field and Weill.

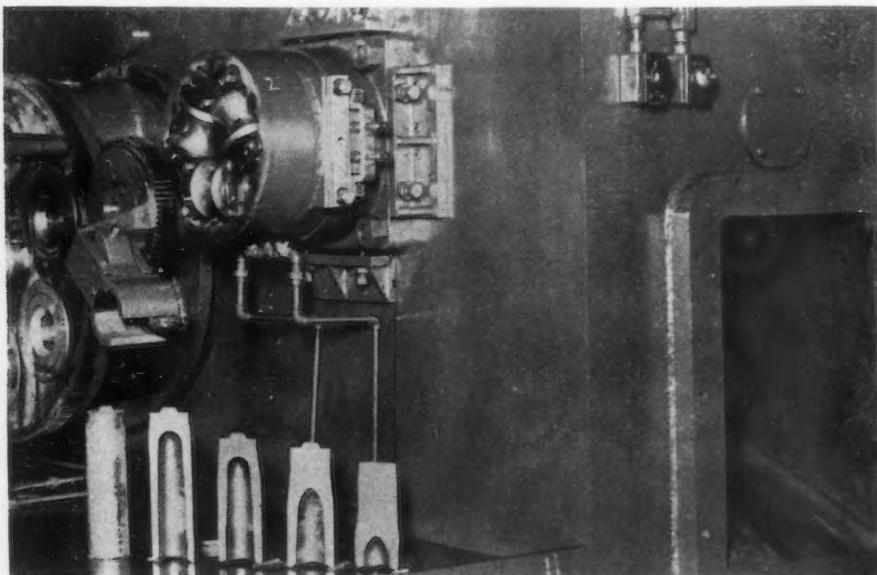
Automatic Shell Fo

COMBINING in one automatic hot forging machine, operations frequently performed separately, the Clearing Machine Co., Chicago, has recently designed and put into operation a four-stage completely automatic, continuous shell forging machine capable of

producing from 240 to 300 finish drawn 90-mm. shell forgings per hr. from hot steel billets. The machine requires fewer men to operate, while producing from three to five times as many shells per hour as on conventional upsetting machines.

Besides its automatic handling features, the machine embodies a number of striking innovations, including: a rotary indexing die table, self-aligning punches and mandrel with automatic stripping, combination roller and ring dies for final drawing of the shell, and automatic cooling and lubrication of the punches and mandrel between each operation.

In the new Clearing press, a steel billet is converted into a finish-drawn shell in four operations (see Fig. 1). The first three combine upsetting and piercing and the fourth operation consists of drawing the shell. All three piercing operations take place without the work being removed from the die in the rotary indexing table. Following piercing, the work is automatically transferred from the die table to the drawing dies by means of a transfer carrier. The die table actually has six stations, three of them being punch cooling stations, located one between each



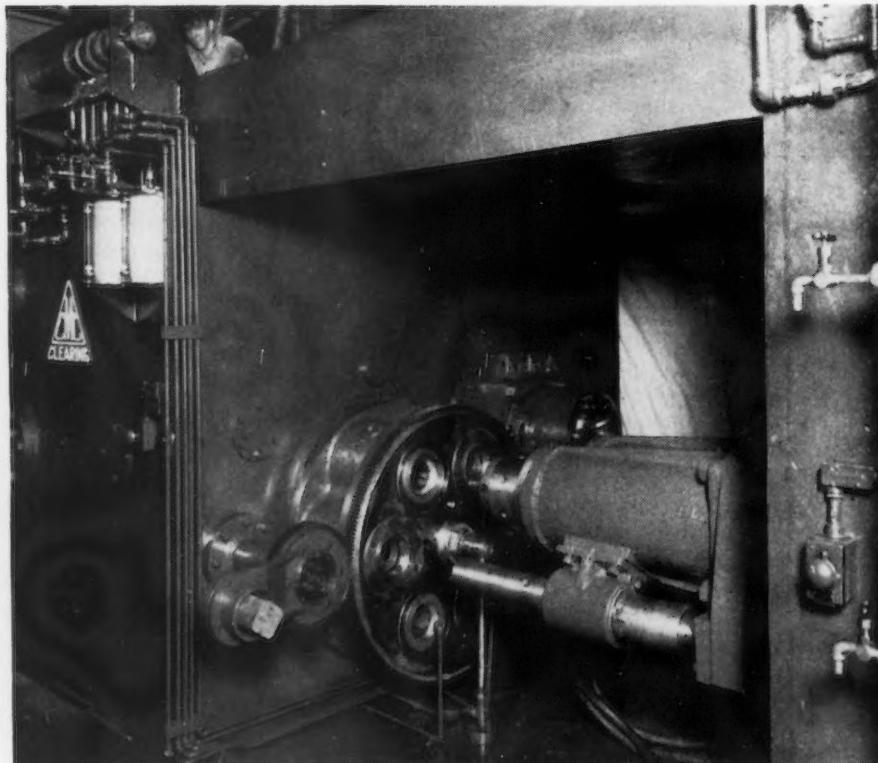
ABOVE

FIG. 1—The drawing dies are composed of combination rollers and rings. Below the drawing die are shown, right to left, the billet after leaving the first punch, after leaving the second punch, after finish piercing and after drawing. An unsectioned shell forging is at the extreme left. Note the chute in back of the drawing dies from which finished forgings drop on a conveyor to cool.

• • •

RIGHT

FIG. 2—The Clearing automatic shell forging machine from the loading side, with billet in loading carrier. Note cooling stations between dies in the rotary indexing table. Lubricant tanks and cams to control flow of the colloidal graphite lubricant are shown at upper left. De-scaler not shown.



1 Forging—240 Per Hr.

pair of dies. On the return stroke of the punches, the die table indexes 60 deg., so that a loaded die and a cooling station are located alternately in front of each punch.

Sequence of Operations

The hot billet is placed in the loading device and is swung in front of the first punch by the rotation of the die table to which the loading arm is geared (see Fig. 2). The first punch pushes the billet into a die on the first forward stroke, slightly upsets the square billet to seat it firmly in the die, and pierces the billet lightly. On the return stroke the alining guide on the punch strips the work from the punch. At the end of the return stroke the die table indexes 60 deg., bringing a cooling station in front of the first punch, while the die containing the lightly pierced billet moves around in front of the second punch.

On the next forward stroke, No. 2, the first punch passes through the cooling station where it is cooled by a controlled hot water spray to bring it back to correct temperature. On the return stroke,

the punch is evenly sprayed with a colloidal graphite lubricant, forming a slick coating of graphite on the punch. At the same time, the second punch, on the forward stroke, is piercing the shell and converting it from a square to the round shape of the die. On the return stroke the hydraulically operated punch guide strips the shell from the second punch. The die table now indexes over another 60 deg., bringing the forging in

front of the third punch, a cooling station in front of the second punch, and a fresh billet in front of the first punch.

On the third forward stroke, therefore, the cavity of the first shell is being finished, while the first punch is piercing a second billet, and the second punch is passing through a cooling station. The second punch is spray lubricated on the return stroke, while the shells are being stripped from the first and third punches. On the next forward stroke, No. 4,—after the die table has again indexed 60 deg.—the now finished-pierced shell is pushed out of the die into a carrier (Fig. 1) from the rear of the die, the third and first punches are being cooled and lubricated, while the second punch is piercing and the loading carrier is in position to receive another hot billet.

Next time the die table indexes, the transfer carrier—also geared to the die table, and now containing the pierced shell—is swung up in front of the drawing unit. On the next forward stroke (No. 5), the drawing mandrel enters the

FIG. 3—Discharge side of the new Clearing shell forging machine capable of producing 240 to 300 finish-drawn 90-mm. shell forgings per hr., automatically from steel billets.



shell and pushes the shell through a set of roller and ring dies which draws the shell to its proper size. On the return stroke the now finished shell forging is stripped automatically from the mandrel and delivered through a chute back of the drawing dies to a conveyor for cooling.

The next indexing of the table swings the transfer carrier back into position to receive the second finish pierced shell. On the next forward stroke (No. 6), the drawing dies and mandrel, now passing idly through the dies, are sprayed with a mixture of air and water to cool them. On the return stroke they are sprayed with a lubricant containing Dag colloidal graphite. The punches are sprayed in the same manner.

Further indexing of the table now brings the die in which the first shell had been pierced into position to receive another billet, completing the table cycle. Prior to this, however, this die cavity has been carried to a position in front of an air jet which thoroughly blows out the die, and then in front of a lubricating jet which sprays it evenly with the colloidal graphite lubricant. Besides, the dies are water cooled.

For every six strokes, the machine produces three completed shell forgings, so that each shell (at the 240 per hour rate) is in the machine a total of around 30 sec. Since the time for each shell in the machine is identical, close control as to size and uniformity is possible. Furthermore, the self-aligning features of the punches and mandrel are designed to hold the

run-out of the forgings to exceptionally close limits, so that less material actually would have to be allowed for machining.

Design Features

Not shown in Fig. 2 is a de-scaler which may be provided ahead of the automatic die loader, for automatically removing scale from the billet. A special device scrapes the piercing end of the billet, producing clean metal—a protection against scale spots in the cavity of the shell. From the de-scaler the billet is automatically transferred to the dies through the loading carrier.

Index operation of the die-table is provided through a Geneva drive, while a set of toggle links produces the proper dwell of the anvil that closes the back end of the dies while the billets are being pierced.

All three piercing punches with their combination self-aligning guides and automatic hydraulic strippers, are mounted on the same head. The drawing mandrel is located on a separate head, but both heads move simultaneously. The reciprocating motion of the punches and mandrel is obtained mechanically through large eccentrics, driven through double gearing from the machine flywheel. The latter is driven by a 150-hp. motor through V-belts, and the drive unit is equipped with a solenoid controlled pneumatic clutch interlocked with a brake in such a manner that when the clutch is "on," the brake is "off," and vice-versa. Operation of the entire machine is through four conveniently

located start and stop buttons. A view of the entire machine is shown in Fig. 3.

Punches and mandrels are provided with a "graphoid" surface prior to installation. This surface, in which minute particles of colloidal graphite actually form a part of the surface material of the punch or mandrel, is obtained by dipping repeatedly in an aqueous dispersion of colloidal graphite. The result is that the tool has a slick dry-lubricating finish, which is maintained in service on the new Clearing forging press by repeated spraying with the graphite lubricant between operations. It effectively prevents sticking of punches and mandrels. Flow of lubricant to each cooling station, as well as flow of water for cooling is controlled through cams and is entirely automatic.

The lubricant may be either the shell forging lubricant now nationally available and consisting of Oildag and Dag graphite dispersion type 1175, suspended in a paraffin base oil, or it may be a special water dispersion of Dag colloidal graphite blended with water-soluble oils. Both of these are developments of Acheson Colloids Corp., Port Huron, Mich.

The Clearing Machine Corp., is now engaged in designing another type of forging machine with the outstanding feature of elimination of all excess metal of the forging. This machine, being fully automatic, is based on the principle of controlled displacement of the metal and will handle shell forgings up to and including 105 mm. with a capacity of 250 to 300 shells per hr.

High-Strength Vanadium Steel

H. CORNELIUS, in *Stahl und Eisen*, reports on experimental work in search for a steel which, in the form of thin sheets and tubes, can be satisfactorily welded and after heat treatment has a tensile value of a minimum of 128,130 lb. per sq. in. and a yield point of at least 102,370 lb. per sq. in.

High-frequency products were prepared containing 0.25 to 0.30 per cent C, 0.3 to 0.8 per cent Si, 0.5 to 1.6 per cent Mn and 0.25 to 0.6 per cent V, and some with 0.5

to 1 per cent Cr. Main interest turned on the use of vanadium for the production of these steels, as this element is available in sufficient quantities in Germany, while there is a shortage of molybdenum. Vanadium steels have, in fact, already been studied in great detail by German aeronautical research bodies with a view to their substitution in aircraft for the molybdenum steels. Of the steels investigated by Mr. Cornelius, those with satisfactory mechanical properties after welding with or without heat

treatment were a 0.25 per cent C, 0.3 per cent Si, 0.6 per cent Mn, 1 per cent Cr and 0.25 per cent V steel; and one with 0.3 per cent C, 0.4 per cent Si, 1.2 per cent Mn, 0.6 per cent Cr and 0.25 per cent V. A suitable substitute chosen for the 0.25 per cent C, 1 per cent Cr and 0.20 per cent Mo steel, which is in extensive use, is a steel with 0.24 to 0.30 per cent C, 1.0 to 1.3 per cent Mn, 0.6 to 0.9 per cent Cr and 0.1 to 0.2 per cent V, of which trial melts gave satisfactory results.

Work Machine Tools Longer Hours

By WENDELL E. WHIPP

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Sidney, Ohio

MACHINE tool builders as a whole are already operating their plants about as many hours per week as is humanly possible. Over 95 per cent of the employees of the industry are working for companies operating two or three shifts. And many of those operating two shifts are working long shifts of 10 and 11 hours each.

Hence, when I urge longer hours for machine tools, I am not thinking of the machine tools already fully engaged in machine tool builders' plants. I am talking about the machine tools installed in all the other metal working plants throughout the United States. Many of these machine tools are being operated little more than 40 hours a week. Why can't these machines—like those in machine tool plants—work longer hours for national defense?

Why today's tremendous pressure to build vast new quantities of new machine tools when there are already thousands of machine tools which are only being worked part time?

No one doubts the fact that the national defense program created a sudden need for new machine tools surpassing anything hitherto even dreamed of in the history of the industry. The industry's remarkable response to that challenge is now an accomplished fact. The industry will produce this year \$750,000,000 of machine tools—a total greater than the combined production of the eight pre-war years of 1930 to 1937 inclusive.

The machine tool program will

"**T**HERE has been too much inclination both on the part of Washington and on the part of manufacturers to assume that the only way to get the defense production job done is to build and equip vast new plants in large cities, with all equipment modern . . ." Mr. Whipp advocates spreading the work more widely on existing machines, which in many plants are still operating only 40 hours a week. He puts the responsibility up to the big prime contractors who, he urges, should lend their high-grade technical and supervisory skill to the little plants in the smaller industrial communities, to which more subcontracts should be given.

continue to be one of steady, substantial increases in production. But in the meantime cannot more be done to put into operation the machine tools already in existence?

Plenty of Existing Machines

There are more machine tools in the country's factories today than many people are aware of. According to reliable surveys, machine tools constitute about 70 per cent of all of the metal-working equipment in the United States.

Machine tools are not confined to plants of the type ordinarily thought of in connection with defense work. For instance, you will find machine tools in textile plants, in railroad repair shops, in carpet factories, in automobile body shops, in can factories, and in printing press plants. You will find machine tools in factories making consumer goods such as radio parts, bed springs, skates, bathroom fixtures, golf clubs and fountain pens.

The fact is that almost all products shaped from metal require machine tools to a greater or less extent for their manufacture. And

therefore machine tools exist in almost every plant working in metal.

Machine tools are most emphatically durable goods. On the average, at least two-thirds of the machine tools in the plants of the country today are over 10 years old. The fact is that the major portion of 20 years' production of machine tools is still in existence and still set up and in working order.

Now let's keep right on building new machine tools. The defense program needs all we can build. But in the meantime let's put all existing machine tools to work just as many hours as possible on national defense. Certainly this would seem more practicable than to attempt further broad expansion of machine tool plants.

Plant expansions today would actually add to current shortages. They would require steel and other materials—and we need these materials for defense production. They would require men—and we need men for defense production. And most important of all, they would require a large number of new ma-

chine tools—for it takes machine tools to make machine tools. And all new machine tools today are needed directly for national defense output.

Furthermore, it takes time to build and equip new plants and start them in operation, and time is too vital for that today. It takes time to train new operators, to plan production schedules and put them into effect.

New machine tool plants would mean more machine tools tomorrow, but we need more machine tools *today*. Hitler is on the march. We can't wait.

Isn't the obvious answer to make maximum use of the machine tools already in existence which now are only being used part time? The problem, of course, is *how to do it*.

Commandeering Not the Answer

One method mentioned in connection with current legislation is for the government to commandeer machine tools in plants where they are now being used only part time, or where they are employed in non-defense work, and move these machine tools to plants which are working full time on national defense production.

To my mind there are serious objections to this method. In the first place, it would cripple the factories from which the machine is taken. It might throw a plant out of balance and well-nigh destroy its productive capacity—and we need all the productive capacity we have if we are going to arm this country and at the same time maintain the necessary flow of non-defense products.

In the second place, it would separate machine tools from machine tool operators, for, to say the least, it would be difficult to ship operators as well as machines from one plant to another. The result would be that in one place we would have operators without machines, and in another we would have machines without operators. This sort of dislocation would certainly be unproductive of results.

And in the third place, I think this procedure would unnecessarily eliminate any contribution which this plant as a whole might be able to make to national defense. For instance, a plant not now in defense work, having 15 machine tools, has other metal-working equipment supplementing those machine tools. This equipment as well as the machine tools themselves

might help in national defense. But if the machine tools are removed, that plant is simply put out of the running as far as national defense is concerned.

Spread Defense Work

Therefore in my opinion the only constructive method of getting more machine tools at work longer hours is to bring national defense production into all of the nation's plants now possessing machine tools working only part time.

The first reaction to this premise is, of course, "But that's impractical. In fact, it's impossible. It can't be done."

The reasons ordinarily cited in support of this point of view are legion. To cite only a few: Many of the older machine tools, especially those in smaller plants, do not possess the accuracy required for national defense production. Many of the nation's machine tools are located in small plants which do not have the engineering skill or the type of supervision necessary for national defense production.

National defense orders are usually for very large quantities, and a small plant which has only a few machine tools, or even a larger plant in which machine tools represent only a small share of the equipment, cannot possibly take on a national defense contract, because it couldn't handle a large enough volume.

There are no trained machine tool operators available to inaugurate a night shift, and it's too difficult to train new ones.

I could no doubt continue with 10 or 20 more reasons explaining why the job can't be done. But we're not interested today in reasons why it can't be done. We are interested in methods by which it can be done.

Difficulties Admitted

Of course it will be difficult. Arming this nation for national defense is difficult. This is no child's play that we are engaged upon. This is a crisis involving the freedom of our people and the destiny of our nation. We cannot let mere difficulties stand in our way.

The real question is—is it impossible? And my contention is most emphatically that it is not impossible. We in the machine tool industry have had considerable experience with the "impossible."

I firmly believe that by far the greater part of the nation's ma-

chine tools which are now idle or only working part time can be put to work day and night, for national defense—and put to work right where they stand, without the need for commandeering by the federal government.

The only method by which this can be accomplished is obviously extensive subcontracting. To my mind we have barely scratched the surface of subcontracting possibilities in this defense program. There has been a very natural reluctance to push in this direction because of the very difficulties mentioned above. Subcontracting is full of grief and trouble. But there will be still more grief and trouble if we do not succeed in getting this country armed in time.

How can we overcome some of the difficulties involved in subcontracting?

Challenges Subcontracting Problems

First, let us take the point that many of the older machine tools in the smaller plants do not possess the accuracy requisite for defense work. Very well. Not all of the operations involved in a defense production contract require extreme accuracy. It is up to the prime contractor to perform the operations requiring extreme accuracy in his own plant, or in a subcontractor's plant which has precision equipment, and subcontract the operations requiring less accuracy to smaller plants whose machine tools have a lower standard of performance.

The subcontractor does not have the engineering skill or the supervisory personnel required for defense production. Very well. It is up to the prime contractor to supply to the subcontractor that engineering skill and that supervisory personnel.

The small subcontractor does not know how to train new machine tool operators for a night shift. Very well, it is up to the prime contractor to help the subcontractor train new men.

And remember in connection with the problem of engineering skill, supervision and training, the problem may not be as serious as anticipated, because the field involved may be a small one. The job of one particular subcontractor may be simply that of performing three operations on one particular part. Therefore, engineering, supervision and training—and for that matter the setup on the machine tools



themselves—may be confined to those three operations.

Bear in mind that the small plant with a comparatively small number of machine tools now working, let us say, only 40 hours a week, can get into the defense program only with the aid and cooperation of the larger manufacturer.

Responsibility of Prime Contractors

No matter how anxious the head of such a plant may be to put all his facilities at work, day and night, for national defense, he can only do so by securing a subcontract. He can't tackle the whole job—he can only do one piece of the job. He has to get that piece from some other company. This places a responsibility upon larger companies for taking the initiative in extending subcontracting.

There is another important reason for this. To secure a government contract a company must post a bond. It must make a bid, and it

must promise delivery. This requires financial responsibility of a type which many small companies do not possess.

I have an idea that many larger companies now engaged in non-defense production may be overlooking both their responsibilities and their possibilities as prime contractors in national defense work.

The fact that most of the manufacturing facilities of a substantial and well-financed company are not adaptable to national defense work does not constitute sufficient reason for that company avoiding its potential responsibility as a prime contractor in national defense. For such a company possesses without question two requisites for a prime contract—it has the financial responsibility, and it has, no doubt, the engineering skill and the supervisory personnel capable of overseeing defense work.

It probably has also some facilities of its own which could be adapted to defense production and could spare or could arrange for plant space to be used as an assembly room for work farmed out to other smaller companies on a subcontract basis.

Frankly, before we are through with this job I expect to see textile mills making shells, carpet plants making machine gun parts, and roller skate manufacturers making hand grenades. These plants will, of course, not actually be "making" these products. But they will be the prime contractors and will be responsible for their manufacture.

Let me present to you as I see it the problem which I think the national defense picture presents to the typical smaller industrial city

in the United States. In such a city you will find at least one larger plant well established and soundly financed, and several other smaller plants possessing a certain amount of machine tool equipment. It seems to me that it is the responsibility of that larger company, no matter what may be the business in which it is engaged, to help round up the production facilities in its community and endeavor to make them available for national defense.

Survey of Facilities Needed

A survey of the facilities in the community will show the larger manufacturer what sort of a product the town as a whole might be able to turn out. Armed with this information, he can then go after a prime contract. Or perhaps he can go after a subcontract which he in turn will sub-subcontract. In any event, he will see to it that all of the machine tools, and all of the

other productive facilities in his city that can be used for national defense are being used for that purpose, day and night, to the greatest extent of their productive capacity.

I know full well that I am describing an objective which can never be fully attained. But let us at least accept it as an objective, and strive toward it with every resource which we have at our command, instead of approaching it reluctantly with a recital of the many difficulties involved.

Certainly we can make a more intensive effort to try out this method. To my mind there has been altogether too much inclination both upon the part of Washington and upon the part of manufacturers to assume that the only practical way to get the defense production job done was to build and equip vast new plants in large cities, with all equipment modern and with top-

notch engineering and supervisory skill.

Of course this would be the easiest way, the finest way, if we had plenty of time and plenty of men and plenty of materials. But we haven't! We're up against an emergency now.

If there's a famine in September you can't feed the people by giving them figures on the acreage of winter wheat to be cut next July.

If you're caught on a rock by a rising tide, it won't help you a particle to read a schedule that tells you a boat will pass your way next Thursday.

National defense production must be forthcoming now. And if we haven't enough new machine tools to do the whole job, we must do it on the machine tools which we already have. Certainly we can and must put all our existing machine tools to work day and night. Every hour that a machine tool is idle is an hour lost in national defense.

Data on Use of Aluminum in Aircraft

THE expansion of production of aircraft and aircraft parts outside of regular manufacturers has led to a demand for information about aluminum and aluminum alloys. Information and data needed to employ the use of aluminum successfully in airplane construction, intended primarily for the newcomer in the field rather than the veteran aircraft manufacturer, is included in "Aluminum in Air-

craft," a new publication issued by the Aluminum Co., of America. Government specifications, conditions of heat treatment, aging data, mechanical properties, commercial tolerances, standard sizes, and other valuable data are given on aluminum and the wide variety of aluminum products. Airframe fabrication and choice of materials and processes are also discussed in this handbook.

"Forming Aluminum," another Alcoa publication just off the press, discusses blanking and piercing, drawing, spinning, shape forming, embossing, coining, and stamping aluminum and aluminum alloys, as well as the selection of the proper alloy for specific requirements. Tools, tool set-ups, tool and job lubricants and effects of manufacturing processes on the various alloys are shown.

Ferrous Metals and Non-Metals Photosensitized

WITHIN the past year there have been frequent mentions of methods to photosensitize aluminum (See THE IRON AGE, Mar. 6, 1941, p. 52, Oct. 10, 1940, p. 61.) primarily for use in speeding aircraft production. Recently Republic Engineering Products, Inc., 480 Lexington Avenue, New York, announced a process whereby steel and steel alloys, brass, copper, plywood and plastics can be supplied

coated with a sensitized emulsion for making photographic copies and enlargements of all kinds and for all purposes, including pictorial types.

For instance, in making templates the drawing is photographed directly on the sensitized surface and then developed. It is pointed out that this method saves considerable time, since the necessity of hand marking the template is obvi-

ated. Materials can be supplied in a variety of thicknesses for a number of applications, as for instance name plates, instrument dials, escutcheon plates and permanent instruction sheets. In this way it is said that production is speeded up and made cheaper. Commercial photographers will be appointed by the makers throughout the country to do the necessary processing for those users who do not wish to do their own photographic work.

New Equipment . . .

Machine Tools

Many design improvements and construction advances in lathes, boring machines, milling machines, profilers and other machine tools have resulted from the heavy demand placed upon machine tool builders by the national defense program. Some of these improvements are discussed in this week's section on new equipment.

A NEW line of double end boring lathes, recently designed and built by *Wickes Brothers*, Saginaw, Mich., were especially designed for boring hollow steel forgings from both ends simultaneously. The machine illustrated has a 30 in. hollow spindle and a 25 ft. bed on each end. The ends of the beds are equipped with a 12 in. x 20 ft. boring bar and there is an independent feed box on each end, driven by a variable speed d.c. motor. The main drive motor is 50 hp., variable speed, with three mechanical speed changes in the headstock. The work forging is driven by the faceplates on either side of the centerdrive headstock and is supported in four-jaw steadyrests as well. The lathe weighs about 183,000 lb. with all of its electrical equipment.

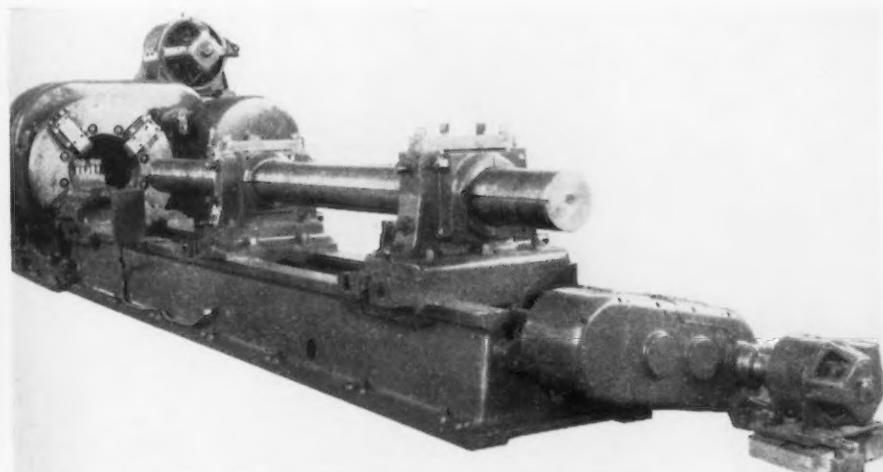
Hydraulic Honer

THE No. 1 horizontal hydraulic honer, built by the *Barnes Drill Co.*, Rockford, Ill., has a capacity for honing long bores up to 1½ in. in diameter. The standard working

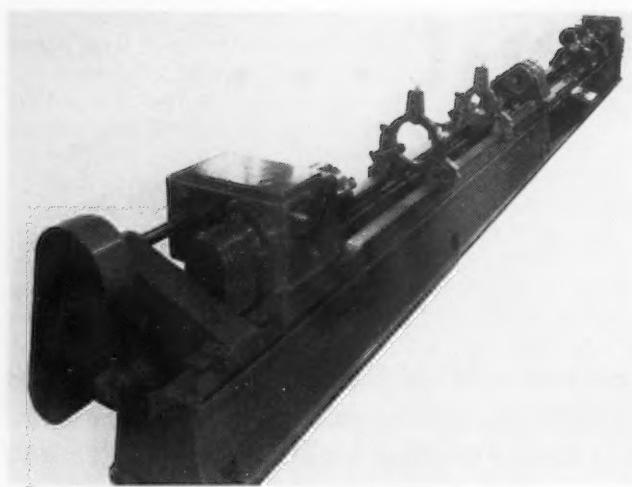
stroke is 8 ft., but the machine can be built with a shorter stroke of 6 ft. or up to a maximum of 12 ft. The design of this No. 1 size with hydraulic cylinder and piston for reciprocating the carriage, produces a smooth, true finish on the internal



cylindrical walls of rifle bores, tubes, cylinders and other long work within the capacity of the machine. Change in direction of travel at each end of stroke is effected quickly and without shock, with controlled overrun. Control is electric-hydraulic. For blind end honing, a special control feature known as the hydraulic dwell can be furnished, so that the spindle will hesitate slightly at the blind end for removal of all of the stock. A patented unitary control lever permits easy and convenient control of the machine.



NEW EQUIPMENT



Deep Hole Boring Machine

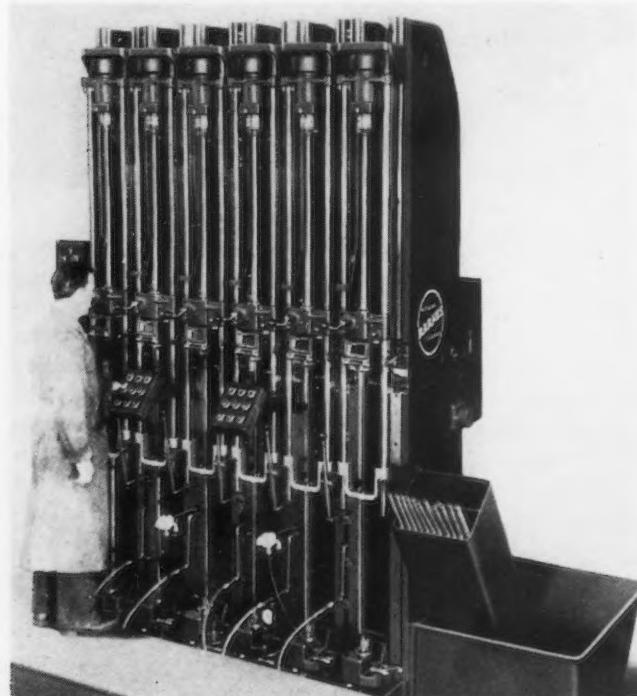
BUILDERS IRON FOUNDRY, Providence, makes a standard deep hole boring machine with a drilling or boring capacity 156 in. long and 105 mm. in diameter. The machine consists of a rigid bed upon which is mounted a geared headstock equipped with a chuck for holding and rotating the barrel; suitable support for the opposite end of the barrel; supports for the drill or boring bar; and means for holding and feeding the drill or boring bar into the work. The head-

screw through pick-off gears, giving a total of 14 feed rates, with a minimum of 0.2 in. per min. and a maximum of 3 in. per min. The carriage is moved at the rate of 60 in. per min. in either direction by a separate motor. An adjustable holding device for the boring bar permits release of the tool in the carriage and opening of a limit switch, stopping the spindle and feed motors, should the machine be overloaded because of excessive feeds or hard spots.

occupies a minimum of floor space. The six spindle heads are provided with individual hydraulic actuation. Each has an automatically actuated three-jaw self-centering chuck for

Multi-Spindle Rifle Drilling

THIS six spindle vertical drilling machine made by *W. F. and John Barnes*, Rockford, Ill., is designed to drill rifle barrels and



stock has three speeds and is driven by V-belts and pulleys from a four-speed a.c. motor, giving a total of 12 speed changes, with a minimum speed of 20 r.p.m. and a maximum of 375 r.p.m. The boring bar is mounted in a carriage driven by a lead screw. A separate feed motor drives the

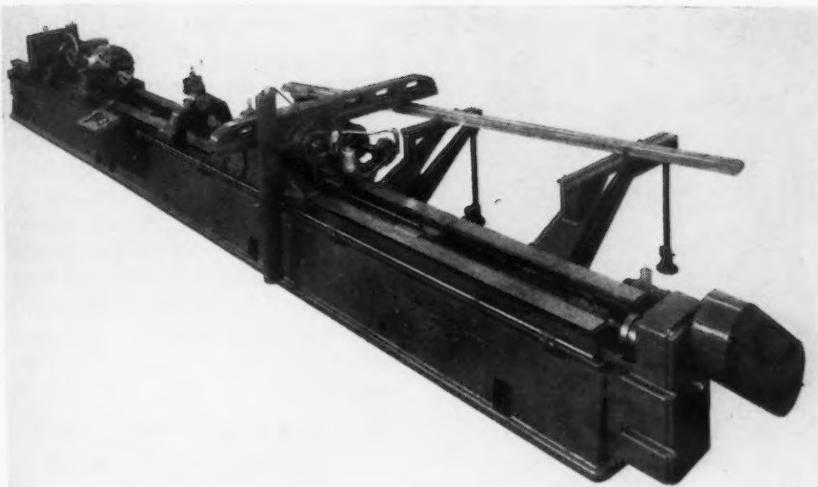
holding the barrel and each is individually driven by cartridge type motors through V-belts. The revolving barrels are fed down over stationary single lip drills. Perfect alignment is maintained by coupling the headstock to the tailstock by steel tie bars, so that the stocks move as an integral unit. The drillers will handle barrels of from 0.30 and 0.50 caliber, up to 45½ in. long and 1¾ in. thick, o.d.

Precision Boring Machine

THE Autometric horizontal universal precision boring machine made by *Autometric Machine Tool Co.*, Berkeley, Cal., permits a complete job to be done in a single setup. The many exclusive features claimed for the machine include: errorless measuring by a more rapid and accurate Autometric method, infinite variation of spindle speeds, infinite selection of feeds, round steel ways, hardened and ground, automatically oiled, spindle direct V-belt driven with no quill and splined shaft to cause wear, deflection and vibrations, and a one piece body casing for permanent alignment and rigidity. Feeds and speeds can be selected and changed as desired, before, during, or after boring, making possible the maximum removal of metal when roughing and a perfect boring finish when finishing.



NEW EQUIPMENT



Deep Hole Rifling Machine

THIS deep hole rifling machine, built by *Builders Iron Foundry*, Providence, consists of a rigid one piece bed upon which is mounted means for holding, supporting, and indexing the barrel to be rifled, and means for reciprocating and rotating the rifling head. A tubular type cutter bar carries the rifling head, and is secured in the headstock. Indexing of the bar is performed manually. The drive for reciprocating the headstock is accomplished through a lead screw. The cutter bar, fastened in the headstock, is supported by one fixed and two movable guides. As the cutter bar is reciprocated, a hardened and ground swivel pin in the fixed guide engages in the spline and rotates the cutter bar. Machine can be furnished with an adjustable sine bar so that a spline of any desired pitch may be cut in the rifling bar. The machine is driven by a four-speed motor, giving cutting speeds of 10, 15 and 20 ft. per min., with a re-

turn speed of 30 ft. per min. The length of rifling that can be done on this machine is 156 in., with a bore of 105 mm. and a rifling lead up to $2\frac{1}{2}$ turns.

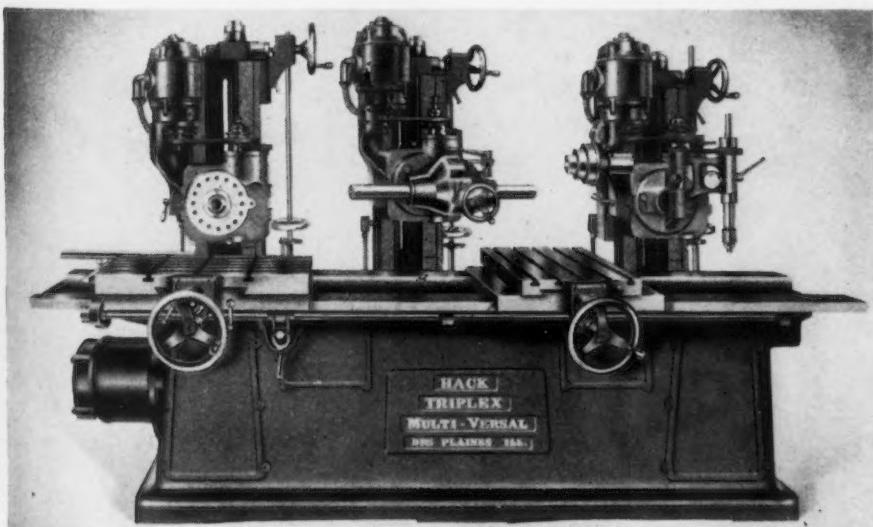
Toolroom Machine

HACK MACHINE CO., Des Plaines, Ill., manufacturers of the Multi-Versal toolroom machines, has recently added the Duplex Multi-Versal and the Triplex Multi-Versal machines to their line. The Duplex is a two column machine embracing the standard Multi-Versal and a $2\frac{1}{2}$ in. horizontal boring bar. This bar travels 18 in. and can be rotated 360 deg. to bore holes at various angles. The bar is fitted with a taper at both ends and will machine work on either the left or right hand tables. The Triplex, illustrated, includes a third column shown at the right normally fitted with a radial drill head, but so constructed as to permit the use of any of the regular Multi-Versal attachments. The left

column has an adjustable reciprocating motion but the middle and right columns are stationary. These stationary columns may be interchanged and additional columns may be added to complete the sequence of operations with one pass of the table. Two men can operate the machine, each performing a completely different operation, and extremely long work can be machined.

Light Grinding Stand

FOR tool and light snagging grinding, *Hammond Machinery Builders, Inc.*, Kalamazoo, Mich., just introduced three new functionally streamlined "OK" model grinders. The heavy-duty motors, furnished in 1, 2, and 3 hp., 220 or 440 volt, three phase, 60 cycle a.c., have

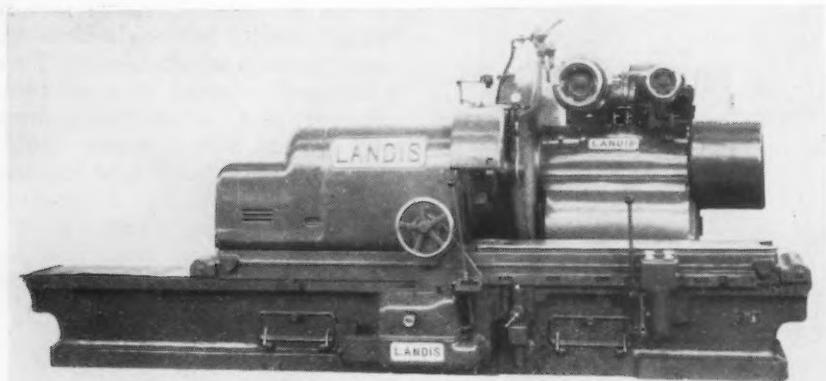


a spindle speed of 1750 r.p.m. The spindles are directly on the motor and accommodate 10, 12 and 14 in. wheels. These grinders are also furnished as a combination grinder-buffer, or with each end of the spindle extended to form a buffering and polishing lathe. All moving parts of the grinder are closely machined and built to rigid specifications for smoothness and precision in operation.

Radial Crank Grinder

ONE of the most recent developments of the *Landis Tool Co.*, Waynesboro, Pa., is the new 25 in. Type D radial crank grinder, a specialized machine just for ra-

NEW EQUIPMENT



dial aircraft crankshaft work. With the proper tooling, however, it is suitable for a variety of operations, such as: rough grinding the pin diameters and adjoining radii, squaring ends of the center section, grinding the web faces adjoining the pins and center section, semi-finish grinding the pin, and finish grinding the pins and adjoining radii after assembly of the shaft. For most set-ups, the wheel base is set at an angle of 4 deg., giving much freer cutting action on both

webs and pins. The headstock is of rugged design and the work spindle is large and hollow, permitting either the long or short end of the crankshaft to be inserted within the end of the spindle during the finish pin grinding operations. A work speed of 30 or 55 r.p.m. is available on the standard machine, and the work rotation will automatically stop always at the same point. A shoulder grinding attachment is part of the equipment of many of these machines.

• • •

Universal Grinding Machines

A NEW line of universal grinding machines, built in 14, 16 and 18 in. swings, and 36, 48 and 72 in. between-center lengths for each swing, has recently been announced by Cincinnati Grinders Inc., Cincinnati, Ohio. Powered hydraulically, the table has infinitely

variable traverse rates of 3 to 220 in. per min. Power table stroke may be set as short as 3/32 in. simulating the action obtained from a reciprocating grinding wheel spindle. Accuracy of automatic reversal is within 0.004 in., allowing the operator to power grind close to shoulders.



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Tool Grinding Attachments

DESIGNED for sharpening both the peripheral and end teeth of end mills, this improved No. 13 end mill sharpening attachment for Brown & Sharpe No. 13 universal and tool grinding machine is of particular value in sharpening the peripheral teeth of steep spiral end mills having straight or taper shanks. For taper shanks, a knob at the rear end of the attachment spindle makes it easy to hold the tooth being ground



in contact with the tooth rest while feeding the cutter across the wheel. Mounting of the spindle on anti-friction bearings provides a sensitive, free-turning unit that is advantageous when sharpening very small end mills having steep spiral.

Internal Thread Grinder

STYLE 39A thread grinder for internal threaded work has been added to the line of the Ex-Cell-O Corp., Detroit. This machine is fully automatic except for the manual steps of loading, shifting the starting lever and resetting the grinding wheel. It features an automatic dressing control suited

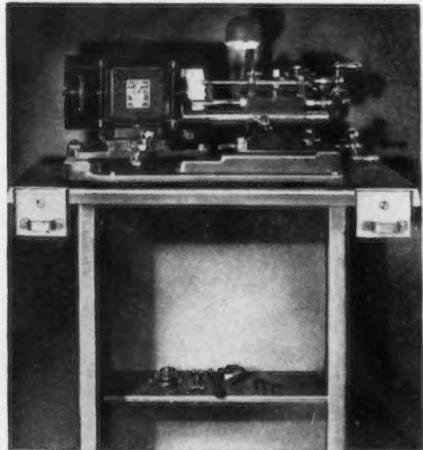


NEW EQUIPMENT

to every type of thread. The machine can be readily operated manually, however, when grinding single parts. Capacity is for threads up to 5 in. in length and within a distance of 15½ in. from the work spindle nose. Maximum hole to be ground is 9½ in., with a minimum of 1 in. Maximum swing of work is 10 in. Taper attachment is available. The headstock incorporates a new type of drive known as the Speed Ranger. By turning a hand-wheel at the front of the unit, an infinite number of speeds may be selected, ranging from 25 to 225 r.p.m. This machine is also made with an optional range of speeds from 40 to 360 r.p.m. Lubrication is principally automatic. Table ways are protected with telescopic guards and are pressure lubricated. The hydraulic system is lubricated from an individual reservoir, and the headstock unit has automatic splash lubrication.

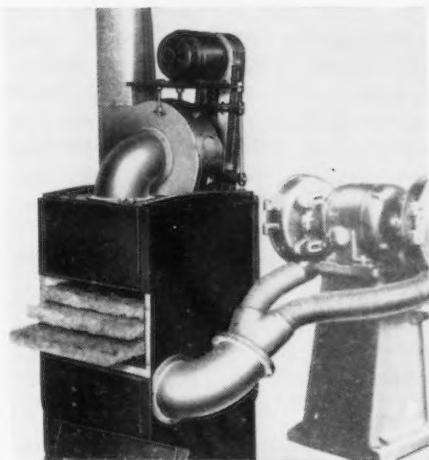
Tap Grinders

THE EDWARD BLAKE CO., Newton Center, Mass., announces the new No. 1 and No. 2 J-B tap grinders. These machines are designed for sharpening taps on the chamfer. They will sharpen 2, 3, 4, and 5 flute taps, and may be equipped for grinding 6, 8, and 10 flute taps. Both right and left



hand taps may be sharpened. Taps may be inserted or removed from the machine in a few seconds and a simple locating device insures correct positioning and duplication of work. J-B tap grinders come complete with motor, two grinding wheels, wheel guards, diamond wheel dresser, wrenches, a draw-in master collet and two bell centers. The No. 1 machine holds taps on

centers up to 5 in.; the No. 2, up to 12 in.



Exhauster and Air Filter

THIS combination exhauster and air filter forces dust laden air into a cyclone collector, removing the coarser particles and, after passing through impingement-type filters which arrest the fine dust, the air is clean enough to be recirculated in the room. The Hisey-Wolf Machine Co., Cincinnati, makes this unit in four sizes, mounting the motor externally for cool operation and providing a handy clean-out for the heavy particles. The filters are readily removable for cleaning by shaking.

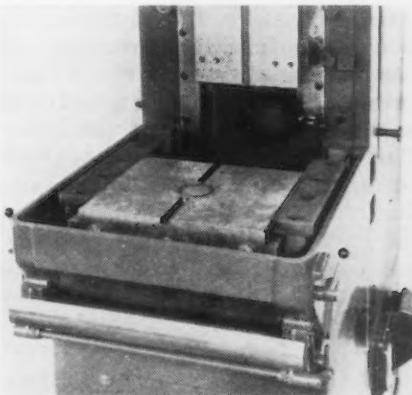
Automatic Screw Machine

AN American built automatic screw machine of the Swiss type, well known for its high accuracy in long pieces, is now being made by the Triplex Machine Tool Co., 125 Barclay Street, New York. With the interruption by the war of the flow of Swiss Bechler machines to the United States, this American made equivalent is now

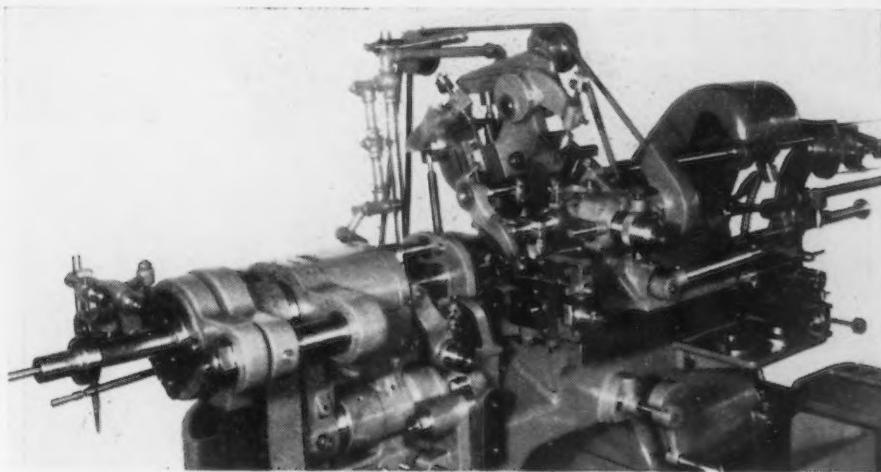
being offered. The machine has a ¾ in. round stock capacity and will turn work 1½ in. long with a flat feed cam or 2 2/3 in. long with a bell cam. It is a single spindle type in which the stock is fed forward through an adjustable guide bushing while it is being acted upon by radially disposed tools. The four toolslides for turning, forming and cutting-off are placed immediately ahead of the guide bushing so that the overhang is at a minimum at the point of the cut and the same accuracy is maintained regardless of the turning length. For spot centering, drilling and right-hand threading, an attachment is provided that successively swings three cutter spindles in line with the work axis. Also, a screw slotting attachment can be furnished.

Broaching Machines

AN improved line of single ram broaching machines with capacities ranging from 3 to 25 tons and strokes from 30 to 66 in., are



now being made by the Colonial Broach Co., Detroit. These machines are adapted for a wider range of tooling than ever before, and peak capacities are increased



NEW EQUIPMENT

to give ample reserve power when operating at normal rated capacities. Column and work platen widths were increased to permit an increased ram width. Improvements simplifying the construction of the receding table mechanism allow for the effective installation of chip wipers, protecting the bearing surfaces of the moving platen. A new table design provides finish-machined pads on the front as well as on both sides for mounting auxiliary units such as cams, used to automatically operate clamps, locks and support jacks on the fixtures. A standard Colonial feature, the patented cam lock and narrow center guide for the receding table mechanism, is incorporated in these broachers.

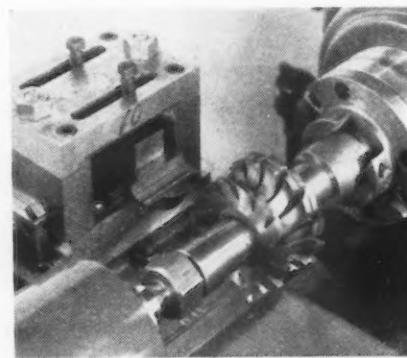
Ram Type Turret Lathe

A 16 in. swing ram type turret lathe designed for rapid production on chucking operations and bar work has been announced by the South Bend Lathe Works, South Bend, Ind. This lathe has a 16 $\frac{1}{4}$ in. swing over the bed ways and saddle wings, 9 $\frac{5}{8}$ in. swing over the tool post saddle cross slide, 1 $\frac{3}{8}$ in. hole through the headstock spindle, and a 1 in. capacity through the collet. This ram type turret has both power and hand feed, with automatic indexing and individual stop for each of the six turret faces. A quick change gear box provides 48 changes of turret power feeds, 48 changes of both the cross and longitudinal feeds for the tool post carriage, and a series of 48 screw

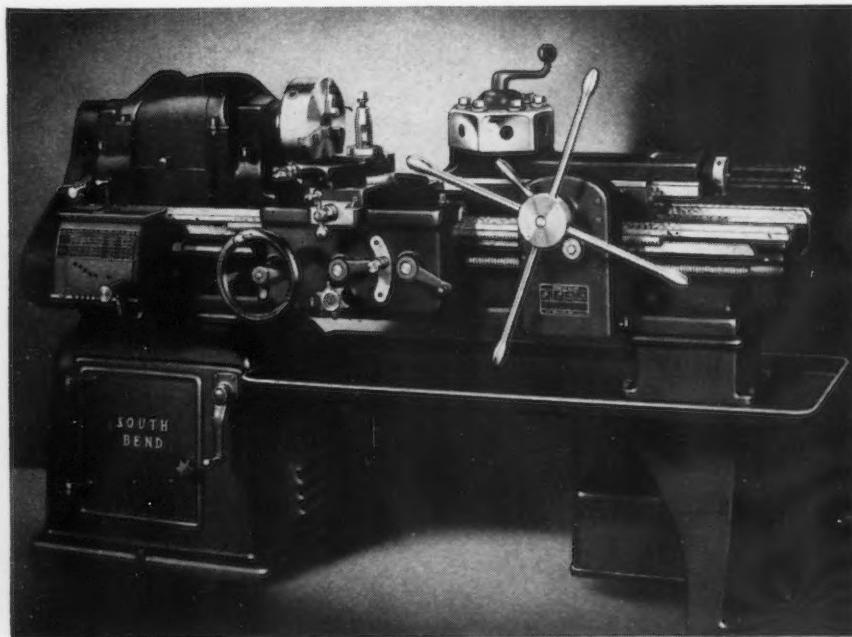
threads, from 4 to 224 threads per in. Provision is made for changing the direction and speed of the turret feeds with relation to the carriage feeds. Available are 12 spindle speeds ranging from 10 to 731 r.p.m. A two speed motor permits quick change from high to low speed for reaming and tapping operations.

Cutter Relieving Machine

SIMPLICITY and speed of manufacture of rotary cutting tools of various types have been improved by a new universal cutter relieving machine, suitable for re-



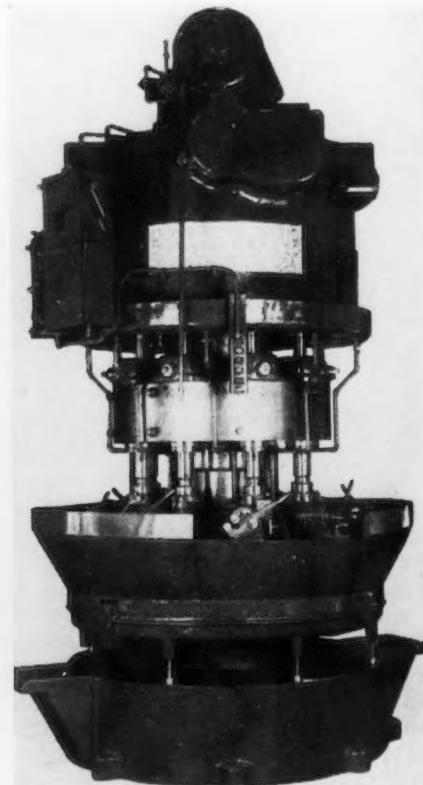
lieving form, gear and rack cutting tools, end milling cutters, spot facers, etc., with radial or side relief, or both. This machine, developed by Michigan Tool Co., Detroit, has a multiple range of forward and reverse speeds to handle a wide variety of forms of work at maximum efficiency; a turntable for cam slide, permitting relieving from any



angle; universal adjustable tool box for quick set-up; quickly interchangeable cams, and lubrication from reservoirs with inspection portholes. The machine will handle work up to 8 in. in diameter, with a maximum length between centers of 24 in. The number of teeth that can be relieved ranges from 1 to 24. Maximum relieving stroke is $\frac{3}{4}$ in., and five relief cams are furnished with the machine.

Vertical Milling Machine

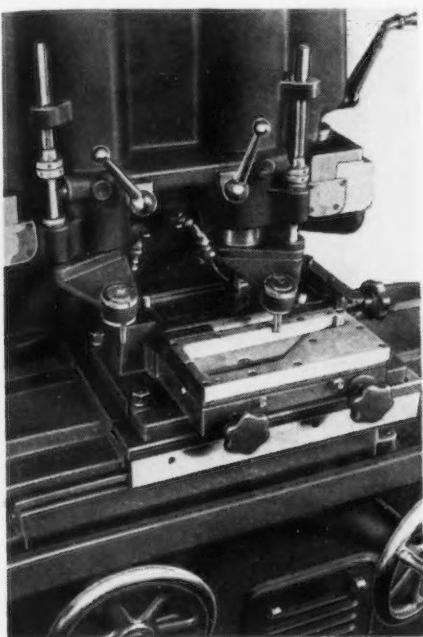
A NEW, eight spindle continuous vertical milling machine for machining square lugs on fuse points for bombs and 75 mm. shells at a production rate of 480 to 600 pieces an hr., is being built by the Davis & Thompson Co., Milwaukee, Wis. Features of this new machine include a complete milling unit in each spindle, hand clamping fixtures adjustable for both depth of cut and travel, automatic discharge of piece when finished, coolant spray so arranged as to wash chips out of the fixture into a chip pan, and loading and unloading at one central point. The fuse point is held in the jaws of the fixture and the entire head of the fixture, with the piece, travels inward past the cutters, the feeding movement being effected by a cam located directly below the table. The cutters finish the top as well as the sides.



NEW EQUIPMENT

Hand Profiler

THE new Red Ring hand profiler duplicates in the work part the profile of a master pattern by properly guiding an end mill, using the master pattern as a guide. Made by the *National Broach & Machine Co.*, Detroit, this profiler is designed to shape intricate mechanical parts, such as those incorporated



in the breech mechanism of small arms and machine guns and for certain aircraft parts and bearings. In order for the cutter to trace the path of an irregular curve, movement is provided in two directions in the horizontal plane. The head, carrying two cutter spindles 10 in. on centers, moves toward and away from the front of the machine. The maximum head travel is 4 in. each way from center. Simultaneously, the table which carries the work and has capacity for two work fix-

tures, moves laterally at right angles with the path of head movement. Its maximum travel is 10 in. each way from center. Thus, the total area covered by the cutter is 160 sq. in. By locking either slide, linear milling may be done without using a master pattern. Each spindle has a micrometer adjustment for cut depth and each is spring counter-balanced for instant retraction when the locking handle is released.

Thread Milling Machine

IN the Murchey No. 32 thread milling machine, made by the *Murchey Machine and Tool Co.*, Detroit, Mich., the milling hob is revolved eccentrically about the work in which the thread is to be cut, and simultaneously rotated on its own axis until the cutting teeth of the cutter are advanced into the work for a sufficient distance to provide the full depth of the thread. Then the cutter, continuously rotating on its own axis, is carried around the work, being advanced by means of a lead screw until the desired helical thread is produced. The machine is intended for mass production of right or left-hand internal or external threads from 1 to 4 in. in diameter, 3 in. long, by means of annular milling cutters covering the full length of the thread. The unit operates at a hob spindle speed of from 49 to 327 r.p.m.

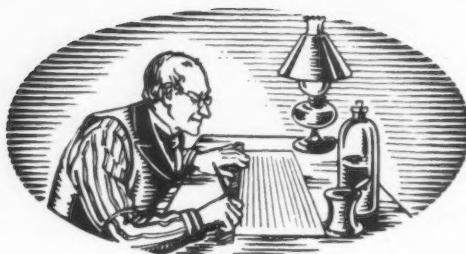


Bed-Type Milling Machine

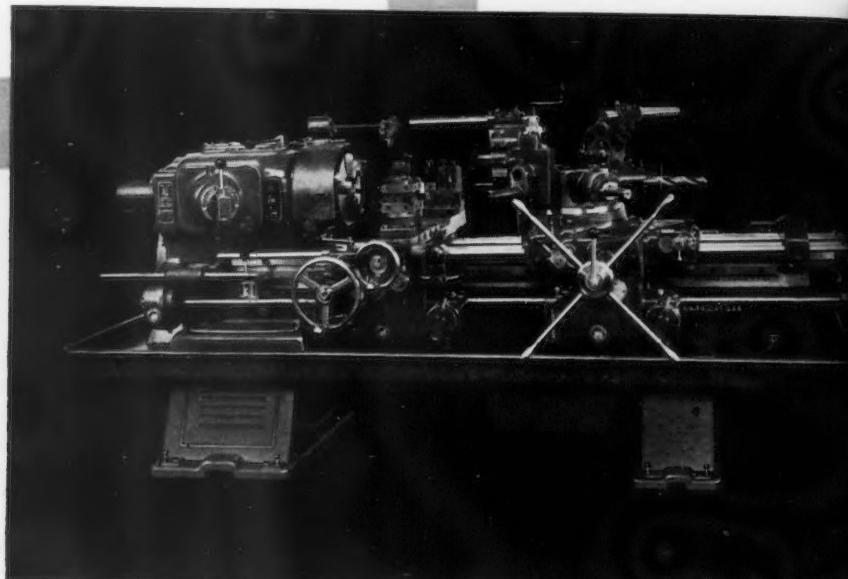
AN automatic bed-type milling machine with hydraulic table feed for production milling of small and medium-sized parts has been added to the miller line of *Van Norman Machine Tool Co.*, Springfield, Mass. This new model, No. 118, incorporates several new features, including automatic table cycle, automatic spindle stop, and rigid construction. The spindle transmission at the rear of the bed is operated by a 3-hp. motor, hinge mounted, to facilitate belt adjustments, and the spindle speed is controlled through pick-off gears. The drive gears have a high-low series, selection of which is lever controlled, and a spindle speed plate lists the gear combinations required for obtaining any of 12 speeds ranging from 30 to 1000 r.p.m. The operating panel has a control lever which can be manually set to any of four positions: neutral, rapid advance, feed and return. A lock arrangement permits the desired table feed rate to be maintained. The normal cycle of the miller is rapid-traverse advance, milling feed, then an automatic rapid-traverse return to starting position, but by the use of additional table dogs it is possible to obtain skip-stop table cycles.



LEMUEL HEDGE



UNTIL 1818, sheets and blank books had been lined by hand, but in that year Lemuel Hedge built the first machine for ruling paper. The same principles are still used in modern ruling machines. By replacing handwork with sound mechanical means for controlling both tool and work, this early Vermont machine builder cut the cost of this operation by 75%. This is another instance where the direct predecessors of Jones & Lamson performed an outstanding service to industry.



No. 7A Jones & Lamson Saddle Type Universal Turn Lathe with standard chucking equipment.

JONES & LAMSON



AUTOMATIC THREAD GRINDERS



OPTICAL COMPARATORS



RAM TYPE UNIVERSAL TURRET LATHE

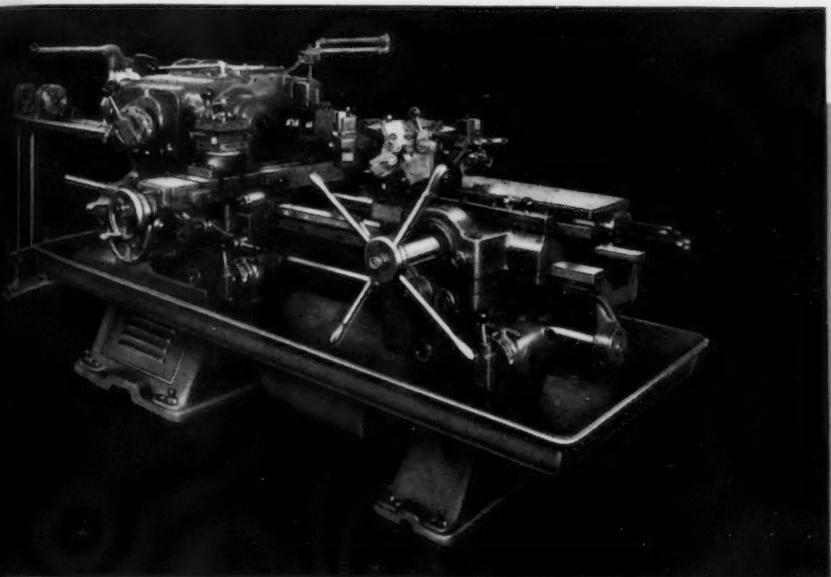
is still cutting costs for you!

Most of the machines built by Lemuel Hedge have long been obsolete. Obsolete also are the pioneer models of Vermont men who followed Hedge — men like Hubbard, Robbins, Lawrence, Howe and Hartness. Yet their original designs survive today, to cut costs for you, in modern Jones & Lamson Machine Tools — improved, advanced and speeded up through ceaseless development by present day Jones & Lamson engineers.

Because of these improvements, every modern Jones & Lamson machine embodies

exceptional reserves of speed, rigidity and useful power. With these modern machines you can take full advantage of the hard alloy cutting tools now available or in prospect. With these machines you can meet the present demand for defense production and still be ready to compete successfully for postwar business.

To deal with today's emergency and protect your future profits, put your production problems up to Jones & Lamson engineers. Inquiries from large companies or small receive prompt attention here.



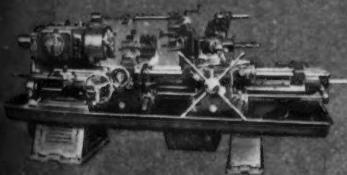
No. 3 Jones & Lamson Ram Type Universal Turret Lathe
with standard bar equipment.

PROFIT PRODUCING MACHINE TOOLS

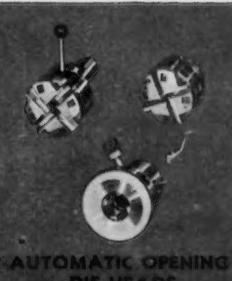
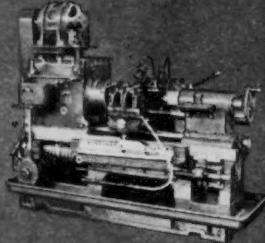
*Manufacturers of Ram & Saddle Type
Universal Turret Lathes . . . Fay Auto-
matic Lathes . . . Automatic Thread
Grinding Machines . . . Comparators
. . . Automatic Opening Threading
Dies and Chasers*

MACHINE COMPANY SPRINGFIELD, VERMONT, U. S. A.

SADDLE TYPE
UNIVERSAL TURRET LATHE



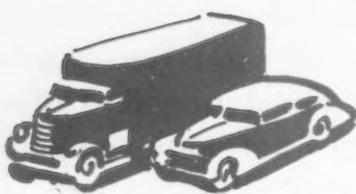
FAY AUTOMATIC LATHES



PROFIT PRODUCING
MACHINE TOOLS

Assembly Line . . .

• December auto output quota 48.4 percent below comparative 1940 volume . . . Unemployment is studied . . . Problems on '42 model names . . . Ford starts new casting plant.



ANNOUNCEMENT of an automobile production quota for December confirmed the preliminary figure first published here two weeks ago, and confirmed as well the gloomy anticipations, operation-wise, of the auto industry. The exact ceiling for passenger car output in December is 204,848 units, off 48.4 per cent from the comparative 1940 total, and much more drastic than the 26.4 per cent cut involving the first four months of the model year.

Chrysler, Ford and General Motors in that order receive the highest proportionate reductions, with individual division allotments calculated on a rather involved basis which makes reference not only to last year's volume, but to average showings of prior periods. The Chrysler cut is 52.3 per cent of last year's volume, that of Ford 51.5 per cent, and of General Motors 50.8 per cent.

Contrasted to these, the independent cuts range from 45 per cent (for Nash) down to 18.4 per cent (Studebaker). Hudson's production projection is larger than last year's output in December, which was subject to undue slowing. The minor volume of Willys and Crosley was also moved to a

higher point than the comparative 1940 figure.

BUt ceiling restrictions on output do not appear to be as much of a factor in forthcoming operations as does availability of materials and parts. This situation is becoming more troublesome by the day. Some quarters in the industry believe that sometime between now and the end of the year schedules will be disrupted much worse than at present, due to unavailability of requirements. This is not looked upon as a permanent condition, but one that will intermittently plague the industry during the 1942 model runs, and thereafter through the emergency era.

For example, last week saw one company working three days instead of the five which had been anticipated, due to an unspecified materials shortage. One of the larger passenger car builders ran its assembly lines less than one full day through the entire week, due to shortages of one accessory, apparently available only from a strikebound supplier. Manufacturing departments of two big producers could not get in a full five days.

This is not at all unusual. It could be said that the industry has typically seen at least two or three plants running on the edge of their supply bins every week since they turned to 1942 model output. No light is seen on the horizon; and as a result there is a considerable belief that the coming few months will see output volume seriously restrained by what are, in fact, a collection of minor problems rather than the development of one or two big ones.

Truck manufacturers are afflicted with this same trouble. Many of them are loaded down with the largest order banks in their history; all are intensively engaged in operations. Difficulty in obtaining parts for normal commercial use might well be expected; but these companies say that they are not even getting full requirements for their military vehicle orders. A number of them report that if they could get parts and materials in sufficient quantity they could—and would—

operate at rates perhaps twice as great as at present.

WETHER such situations can be cleared up in the course of time, even with the aid of A-3 priority ratings on medium and heavy trucks, is a moot question. Suppliers throw up their hands and declare inability to obtain enough raw materials to keep up with demand—particularly for parts such as transmissions, axles another running gear, requiring hard steels. Some few purchasing agents declare that A-3 priority ratings are of very little help when mills are loaded with A-1a and A-1b orders absorbing a preponderant share of their facilities.

The current effect of the situation has been to hold the seasonal rise in production well below anticipations for September. Volume last week was estimated by Ward's Reports, Inc., at 60,615 units, up only mildly for this time of year from the previous week's 53,165, and well below the comparative 1940 level of 78,820. Where September assemblies were once scheduled above 325,000 units, it is now doubtful that they will reach as high as 275,000.

The effects of automotive curtailment on employment are being intensively studied. Members of the Labor Division of OPM have been in Detroit for intermittent conferences in recent weeks with auto union and management representatives, and this week sees the start of a House of Representatives committee hearing in the auto city on the same subject. The latter hearing will bring Leon Henderson before the investigators to explain estimates of materials shortages.

Up to now the one achievement of the OPM representatives has been to devise a means of protecting automotive job seniority ratings. The program, briefly outlined, permits non-defense workers in any plant to transfer to defense activities in any other company without losing seniority in their original plants. At any time, their original plants may require their work on defense jobs, they are subject to call.

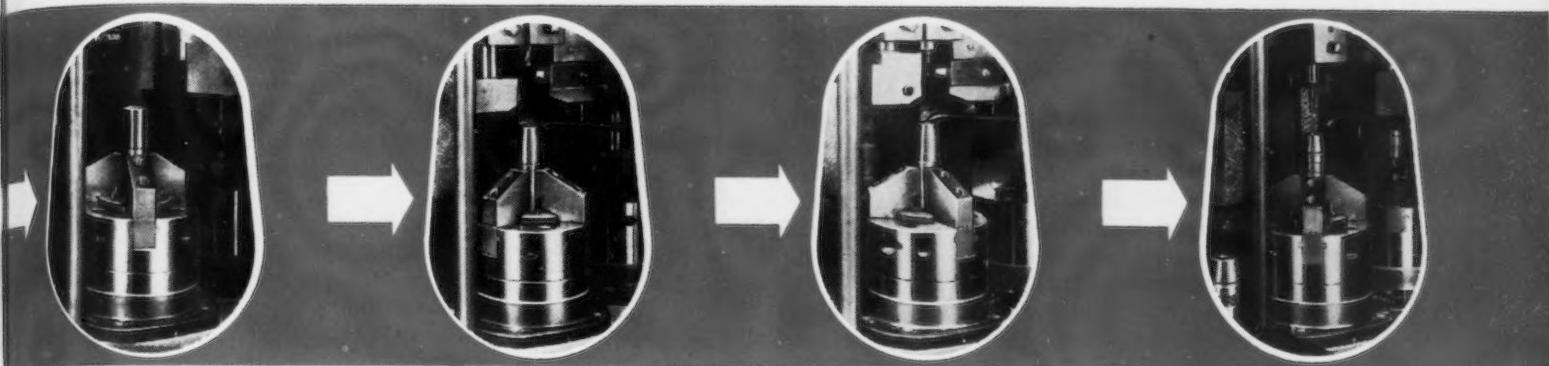
But all the problems of the auto industry are not so deadly serious. The newest concern to crop out—

THE MULT-AU-MATIC WAY

to Machine 3" Anti-Aircraft Shell Cases

1st and 2nd Chucking on the Same Machine

THE NOSE END IS DONE FIRST . . . This way . . .



STATION 1

Load, nose end up in 3 jaw chuck.
(Note loading gage above station.)

STATION 3

Rough bore and chamfer nose with center slide. Rough face top with cross slide.

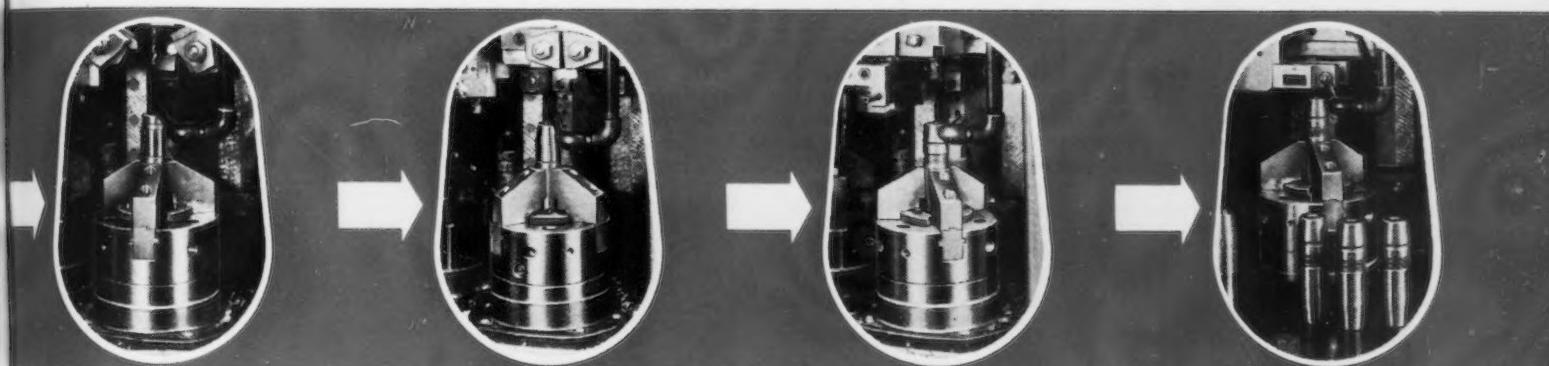
STATION 5

Finish bore, undercut and finish face of nose.

STATION 7

Thread shell nose with collapsing tap.

THEN THE BASE END IS MACHINED . . . Like this . . .



STATION 2

Reload for second time around, base end up.

STATION 4

Remove "stem" with center slide. Rough face with cross slide.

STATION 6

Form the driving band seat grooves.

STATION 8

Finish face the base end and chamfer the band seat groove.

MULT-AU-MATICS ARE MAKING SHELL CASES FROM 37 MM TO 155 MM IN SIZE.
ASK US ABOUT THE SIZES IN WHICH YOU ARE INTERESTED.

BULLARD

THE BULLARD COMPANY
BRIDGEPORT, CONNECTICUT

ON THE ASSEMBLY LINE

and one clothed in a degree of mystery—is that of names for the new cars.

WORDS such as "DeLuxe" and "Super" and "Custom" have been standbys for nearly all companies in years past. Suddenly this month Pontiac eliminated the "DeLuxe," explaining in a note to editors changing the copy that it was at the request of Washington. This started news-hawks to checking, and they learned that some other companies are also considering similar action—allegedly at the request of Mr. Henderson, who was represented as feeling it would be unwise for the industry to represent its products in these utilitarian times as "prettied up." But the office of Mr. Henderson denied that his interests ran toward name-changing. Still, regardless of the reason, the search is on in Detroit executive offices today for names that will connote deluxe—but still not say it.

Developments on defense work continue to keynote the manufacturing news out of the plants.

Ford Motor Co. confirmed that it has work under way on a new steel casting plant which may ul-

timately bulk important in production of plane engine and other defense parts.

Four Bessemer converters, six electric furnaces and other facilities are being prepared, with output schedules aimed at 300 tons of castings daily.

Initial use of the castings will be in a new medium, as cylinder sleeves in Pratt & Whitney engines. The Army has authorized a trial installation on 500 engines in place of the more conventional forged parts.

Ford plans call for the installation of the cast sleeves as a quasi-overflow operation. Forging facilities will be worked in normal volume as the company enlarges its schedules on output of the P&W Double Wasps, and the castings will be used to supplement this production. Thus it may be that several thousand engines will be completed before the trial installations on the 500 are finished up.

Ford engineers estimate that substitution of the cast sleeves will cut machining time on cylinder operations in half, and that cost may be reduced as much as 75 per cent.

These parts are spun out by the

centrifugal casting method, similar to that used on certain types of brake drums. Castings of this sort are also planned for aviation motor center crankcase sections.

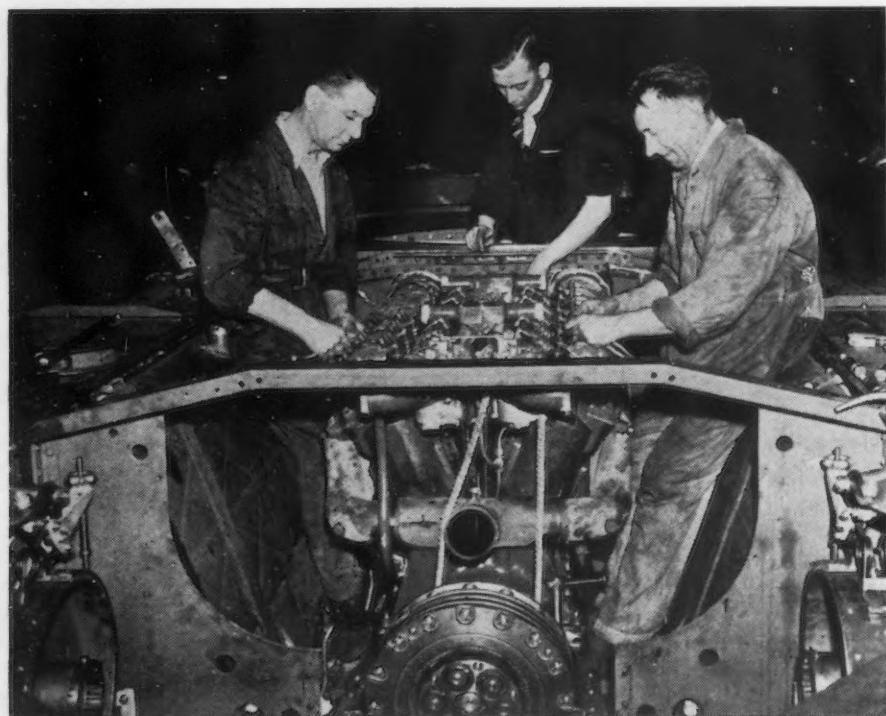
OUTPUT of the new Ford plant will also be employed to attempt castings of armor plate. Ford is reported to be called on to produce some 1200 tons of plate per month for tank installation. Though the Army will not detail the destination of such shipments, it is thought that they may be part of a new tank program whose existence has not yet even been hinted at—a development not related to the plans revealed last week for General Motors output of these military weapons. Details of this rumored development lie in the category of a War Department secret at present.

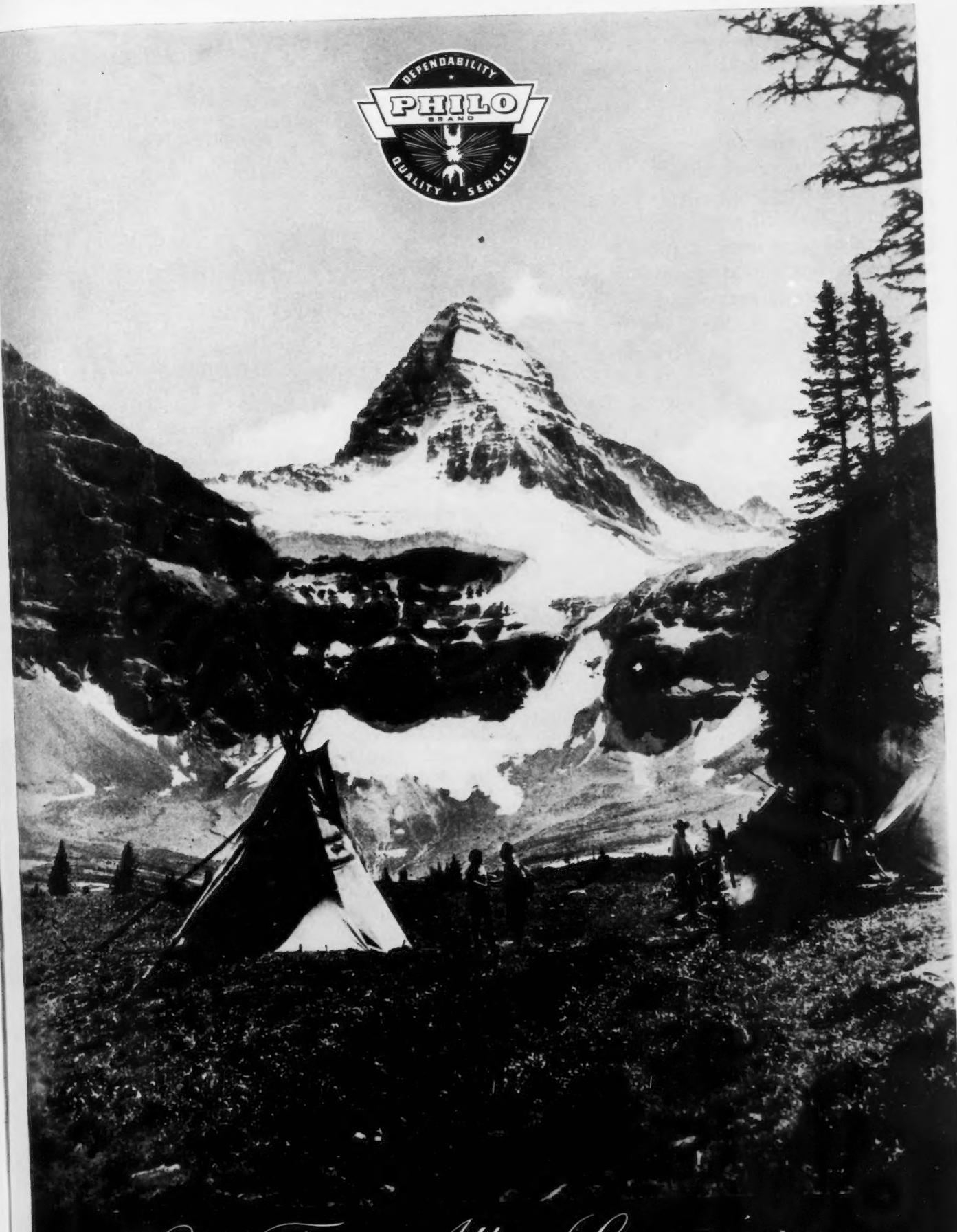
Steel stampings also break into the news in an arms adaptation. National Stamping Co. has developed a new stamped ammunition clip to hold shells for the fast-firing Bofors anti-aircraft gun. The piece was originally designed as a die casting of zinc and aluminum. The new stamped clip is said by the company to weigh the same as the previous die casting, and to be produced at considerably lower cost. The first order received by the company for the new clip, moreover, is said to save some 2000 tons of zinc and aluminum. The clip has been patented and released to the Navy so that production can be spread among other plants.

NASH-KELVINATOR reported that it expects to have its new Lansing, Mich., propeller plant in operation before the end of this year. Full employment of 3000 men will not come until some time later, however. Rehabilitation of other facilities in Lansing is also under way, looking toward output of essential parts of Pratt & Whitney Double Wasp engines.

Pontiac Division, meanwhile, has broken ground and is beginning foundation work on an expansion of facilities at Pontiac, Mich., for manufacture of 20 mm. Oerlikon cannon. The present plant for output of these "answers to the dive bombers" consists of 345,000 sq. ft. of space; when the addition is completed in January more than 650,000 sq. ft. will be devoted to this work.

V-MOTORS FOR BRITISH TANKS: This photograph, one of the first taken of the new British 18-ton cruiser tanks, shows workmen installing the motor. Censor-approved caption said merely "men at work on the powerful engine," but a study of the picture shows the motor to be of the V-type. U.S. tanks of comparable size are powered by aircraft-type radial engines.





Ohio Ferro-Alloys Corporation
Canton, Ohio

Washington . . .

Ickes probably will have to shelve widely discussed pipeline project . . . Regardless of the kind of pipe used, it all works back to a question of ingots, scrap and pig iron.



WASHINGTON—Reaffirmation by SPAB of its denial of priorities on steel plates to build the 1820-mile pipeline from West Texas to New York probably means Oil Administrator Harold L. Ickes will have to shelve the project for the present at least. Whether it ultimately will be constructed apparently depends on developments regarding defense requirements, for both raw and finished steel as well as equipment. Mr. Ickes has been urging quick construction of the line as a national defense project necessary to meet what he called a gas shortage on the Eastern seaboard. In Congress and other sources claims are made that there is no shortage.

In turning down the formal application for a priority rating SPAB sought to soften the blow. It told Deputy Oil Administrator Ralph K. Davies, who presented a formal application for priority on approximately 180,000 tons of plates and 190,000 tons of seamless steel tubes, that while steel plates cannot be spared because of the vital need for ship construction, it took a more favorable attitude in regard to the use of seamless tubing. But here, too, the suggestion was surrounded by contingencies that make it appear Mr. Ickes will not be able to get soon a great deal of seamless tube of the size he wants. He desires 24-in. material and it is reported, despite a thin hope for Mr.

Ickes held out by the Board, that the one producer of this large size is so busily engaged in making bombs and shells that the armed services would not permit interruption of these operations and diversion to production of the seamless tonnage.

MR. ICKES' office shares the doubt that it can get the seamless tube at this time. In its reaction to SPAB'S decision the Oil Administrator's office said it would be impossible to build the pipeline before 1943. While the "wisdom of the decision" was not challenged it was pointed out that with the use of seamless tubing it would take several more months to construct the line than it would if it were built of welded pipe and "we are not even sure of getting priorities on that."

The Board pointed out that billets from which the seamless tubing is extruded are not under as heavy demand as plate and that studies have indicated it would be possible to produce enough tube for at least part of the pipeline without upsetting defense requirements if production schedules were properly adjusted to defense contracts in tube mills.

The question might first be raised whether only a part of the tonnage would be of any value to Mr. Ickes, unless in the improbable event he would shorten the line. Further, it might be questioned seriously that production in tube mills can be "properly adjusted without upsetting defense requirements."

APPARENTLY SPAB itself has doubts on the latter score, for after its restrained reassurance regarding steel for the pipeline, it announced that OPM had been requested to make a further "study" of the project to determine whether, "if sufficient seamless tube is released, the necessary pumps, valves, motors and other accessories can be produced fast enough to be ready for use when the tube is ready."

There is doubt that a great deal of "further study" will be necessary, but the proposal with its big "if" was taken to be a polite way of hobbling Mr. Ickes. He was also assured that the Board had agreed that "if" permission is given to construct the pipeline out of seamless tube, the situation in regard

to plate will be reviewed by SPAB next Spring. Cold comfort this likely is for Mr. Ickes, except that it was a nice way of saying maybe he will eventually get the pipeline, assuming more urgent defense needs don't jam the works and assuming further the project does not die naturally or is not killed by Spring.

INTEREST was manifest also in the Board's fairly comfortable statement about the billet supply. It did not by any means say such a supply is plentiful but by comparison with plates certainly implied billets are much easier to get than are plates. That may be true but many who are engaged in defense work are reported to be complaining that in billets as in other steel products it is difficult to get tonnage.

Governments sources also are stressing the so-called shortage of steel until this idea is firmly implanted in the minds of most of the people of the United States, even though the great bulk of them do not know—and there is no reason why they should be expected to know—anything about productive capacity and demand. Yet, as has been said previously, it again is said, because the point bears emphasis, no matter what steel is used it comes from the ingot.

SO if billets are drawn upon for tube production, the steelworks is called upon to supply raw steel and into its goes scrap and pig iron of which there is a scarcity—shortages due to over-scheduling and possibly also to excessive inventories, some of them in Government hands. This being the case, there is not any point so far as steel supplies are concerned in seeking to turn to billets and tubes as a means of conserving plates even though it is more important in this emergency, as the board cracked, "to provide for ship construction than to insure plenty of gasoline for pleasure driving on the Eastern seaboard."

Meanwhile, it is to be hoped that the study the board has announced regarding inventories will be pursued vigorously and that if it finds excesses, as seems certain, it will shut off those sources that have more steel than current needs require, seeing that hereafter they are fed only as demands justify.

QUICK SET-UP FEATURES *Give Him a Fast Start*



Plenty of "know how" is required to set up jobs like this cast iron sewing machine bed. The operation in the large illustration—milling the throat plate and side plate seat—is one of several, each requiring a different fixture and cutters. Supporting the operator's experience and "know how" are many convenient set-up features which enable him to quickly complete any set-up within the range of the machine—a CINCINNATI No. 2-18 Plain Automatic Miller.

The arbor support and arbor may readily be removed and replaced without removing other parts. One nut clamps and unclamps the quill, which is provided with a micrometer dial for accurate cross adjustment. Covers over the spindle speed and table feed change gear stations are hinged to facilitate changing gears.

These and other features of the CINCINNATI 2-18 combine to produce the parts illustrated at about $2\frac{1}{2}$ times faster than the previous method.

Write for catalog M-965 and see how the 2-18 can pep up your production schedule. Brief description also contained in Sweet's File for Mechanical Industries.



CINCINNATI

**THE CINCINNATI MILLING MACHINE CO. CINCINNATI,
OHIO, U.S.A.**

TOOL ROOM AND MANUFACTURING MILLING MACHINES... SURFACE BROACHING MACHINES... DIE SINKING MACHINES



SHOW THEM TANKS: Since industry is in the first line of defense, why not bring the instruments of defense to the attention of the defenders who make them? Such was the reasoning of Lebanon Steel Foundry, of Lebanon, Pa. Through cooperation with the Ordnance Department, it secured an M-3 light tank to exhibit to its employees at their annual picnic. Lebanon workers have made and are making steel castings for tank parts. Now they know just how their daily work is fitting into defense.

Repair and Supply Setup Adopted for Assisting Mines

Washington

• • • Approximately 15,000 mines, it is estimated, will be affected by a maintenance, repair and supply plan announced last Thursday by OPM Director of Priorities Donald

M. Nelson permitting mining companies to use the highest defense rating, A-1-a, to expedite deliveries of materials needed for emergency repairs and an A-8 rating for operators and their suppliers to obtain material for emergency inventory purposes, operating supplies and ordinary maintenance work. The official Federal Register incorrectly stated that an A-3 rating could be

used for repair and maintenance orders by mines.

The governor of each state has been asked to designate a state official to help administer the order in his state. This official will submit to OPM a list of active mines in the state and will receive monthly lists of mine purchases.

Dr. Wilbur A. Nelson, OPM Priorities Coordinator for Mines, who will administer the order, will assign serial numbers to all mines approved after consideration of lists submitted by each state coordinator.

Purchases made by mines for repair parts, maintenance items and operation supplies will carry an endorsement on the order certifying that purchases are made under the terms of the new order, P-56. No special forms are required in connection with the application of the rating to deliveries. Suppliers of mining operators can extend the rating by a simple endorsement and a reextension can be made to other suppliers in the same manner.

A mine operator or supplier, in order to apply the A-8 rating, must endorse a statement on the original and all copies of each purchase order for material to be used for the purposes specified, certifying that the order is placed in accordance with the terms of the new plan. Before he can apply the A-1-a preference rating for emergency repairs, the operator must first ask permission by telephone, telegram, or letter from the Priorities Coordinator for Mines. Telegram authorization by the Coordinator will be sufficient to permit purchase of the necessary materials under the emergency A-1-a rating.

THE BULL OF THE WOODS

BY J. R. WILLIAMS



HOW MACK TRUCK GOT 72 CARBOLOY TOOLS 6 WEEKS FASTER!

**Standard Tools
Quickly Adapted
To "Specials" In Mack Tool Room**

International-Plainfield Motor Company, Plainfield, New Jersey, well-known manufacturers of Mack trucks, buses and fire apparatus, needed 72 Carboloy tools FAST . . . to bore two types of cylinder blocks.

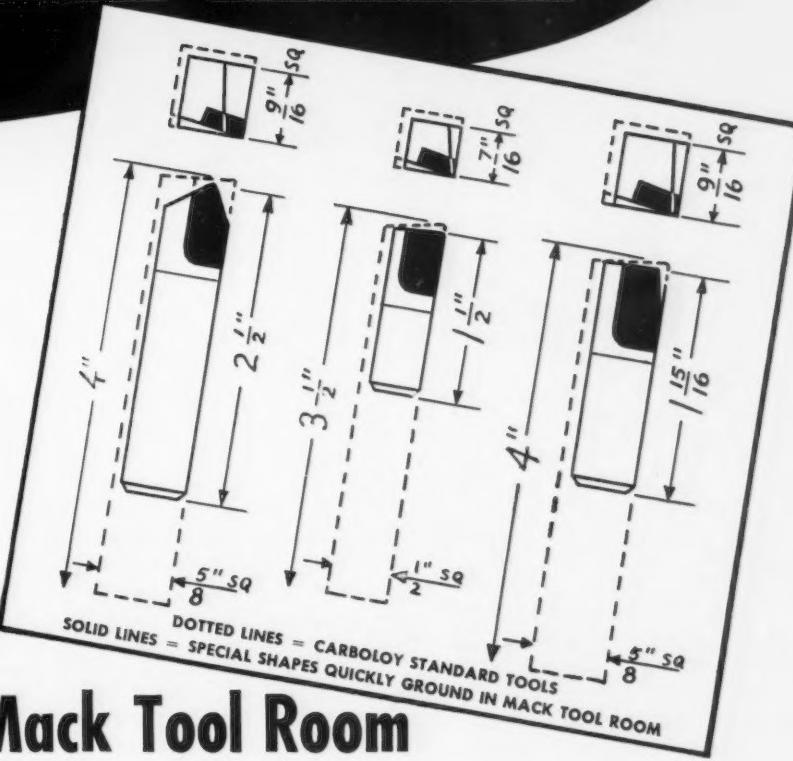
Each tool was a special. Ordinarily that means a long period of waiting for deliveries under present conditions.

But Mack didn't wait! Instead they checked Carboloy Standard Tool specifications . . . found that their special requirements could be quickly adapted from Carboloy

standards. The above sketch shows three examples. The solid lines represent the tools they needed. The dotted lines show the Carboloy Standard Tools they ordered. Into Mack's tool room went these standards—to be quickly adapted

to the special shapes required—then onto the job weeks ahead of the time required for delivery of specials.

May we help you get the same fast results? You always get standards faster than specials . . . and they are adaptable to 60%-80% of all turning, boring and facing jobs. Send for Catalog GT-129.



For Emergency Jobs Braze Your Own

When a job must get underway fast—braze your own tools.

It's a simple, fast, three-step process. Get the facts. Write for booklet GT-133.



Style 100 Style 200
Available in two styles shown. 65 sizes in 3 grades.



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CARBOLOY

"You ALWAYS Get Standards FASTER Than 'Specials'"

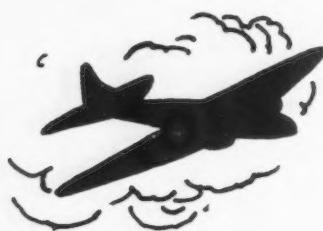
STANDARD
TOOLS & TIPS

CATALOG
GT-129

SEND
FOR FREE
CATALOG

WEST COAST . . .

• Coast aircraft plants, shipyards siphon needed workers from inter-mountain areas . . . Ten thousand will be required at Ogden ordnance depot . . . Few plants employ full staffs on night shifts.



San Francisco

EFFECTS of siphoning off the excess labor supply of the Salt Lake and inter-mountain regions to man Pacific Coast aircraft factories and shipyards will be severely felt before very many months as ordnance and steel plants get under way there.

The problem of a labor supply as parched as the desert which surrounds this territory will be doubly serious because most of the excess supply at Denver, nearest point on the other side of the Rocky Mountains, will have been absorbed by the arms manufacturing plant there. Difficulty will be experienced in retrieving any labor from the Pacific Coast where expanding industry is sponging up workers as fast as they appear.

A proposal to import Negro labor to man increased operations of Columbia Steel Co. at Provo met with a cool reception from the townspeople.

Only about 10 per cent of the 7000 men needed by the government owned small arms plant at Salt Lake City will be skilled. It is probable that a large proportion of these will be trained by Remington Arms Co., which will operate the plant, at its present plant at Bridgeport, Conn. Construction on the Salt Lake plant has just started.

The greatest pinch for skilled labor will be felt at the Ogden Ordnance Depot and adjacent opera-

tions where 10,000 workers will be required, two thirds of them skilled.

Labor requirements of Columbia Steel Co.'s expansion at Provo will depend to a large extent upon what facilities are approved for government financing by the Office of Production Management, but the present estimate is that 3500 men will be required there.

WHILE the Intermountain territory is wondering where it is going to get enough workers to handle its production, the Pacific Coast is not making full use of the workers it already has. It does not take a long memory to recall comment from Washington regarding the necessity of American defense plants working 24 hr. a day, seven days a week. Although some plants are working three shifts daily, very few are employing full staffs on their night shifts, and because of the necessity of paying prohibitive wage premiums for Sunday work, only isolated firms are working seven days a week even in the aircraft and shipbuilding industries.

Spending of millions of dollars on new plants and plant expansions seems futile, indeed, when it is realized that capacity of present plants could be increased nearly 16 per cent by working seven days a week instead of six.

It is going to be hard to convince many people in this section of the seriousness of the national emergency until the government puts its foot down and demands a seven day week in aircraft and shipbuilding industries. No blame can be assessed against firms which have been wedged, practically at gun's point, to labor contracts providing double time pay for Sunday work without any corresponding provision or allowance being made in government purchase terms.

In wage contracts signed last week by eight Southern California aircraft companies typical wage premiums include a 6c. an hour bonus for night work, double pay for work on Sundays and holidays, 3c. an hour additional pay for employees working other than the standard work week and eight hours pay for 6½ hr. work on the overnight shift. It is hard to reconcile this extreme penalty for Sunday operations to what is declared to be a state of extreme

emergency and it is doubtful whether any members of the clergy, even, would protest that the government was violating the Sabbath if Sunday wages were put on a par with other days or at least scaled down to time and a half.

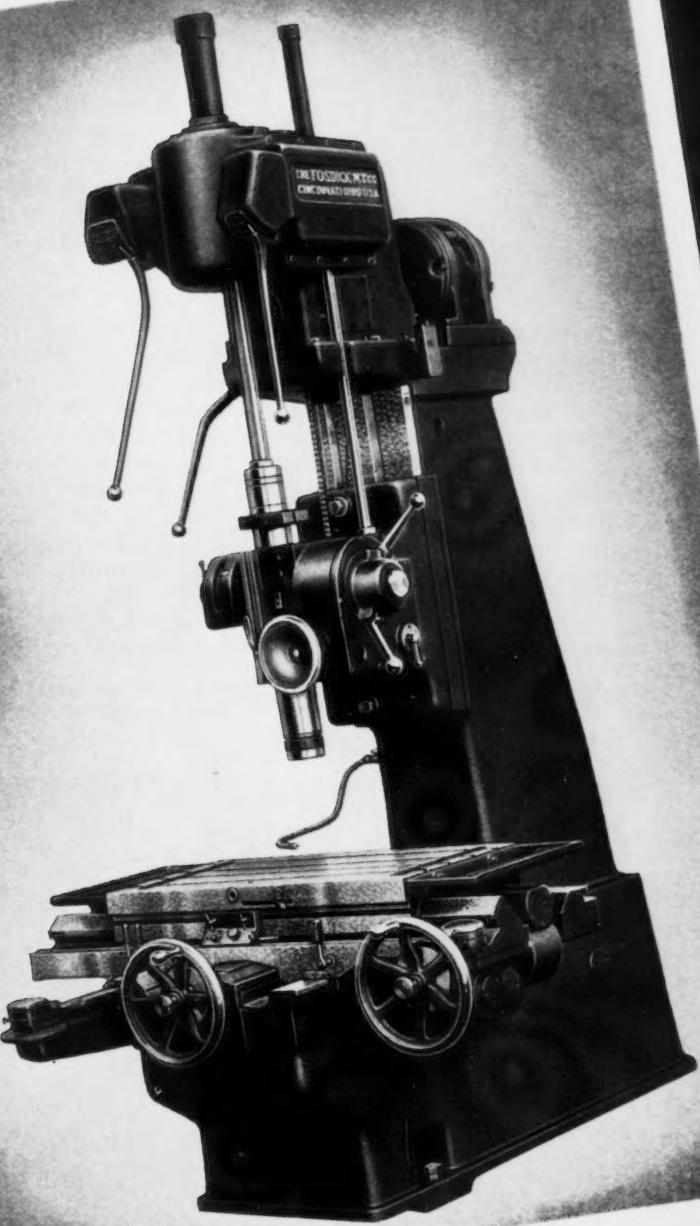
THIS aircraft labor pact provides that for the next two years or during the emergency period (whichever may be longer) production will be uninterrupted by strikes, lockouts, or other labor disputes. However, it did, in effect, sanctify interruptions on Sundays and holidays (by the double pay provision), six holidays with pay during the year, continuance of the policy of vacations with pay—one week for one year's service and two weeks for employees with five year's service.

Employees of many industrial firms who gave up their usual vacations at the request of Mr. Knudsen, in the interests of national defense will no doubt relish the thought of employees of an industry so vital as aircraft lolling in the mountains and at the beaches.

The southern California aircraft wage pacts were set up at company - union conferences and were approved by the Army, the Office of Production Management and the United States Conciliation Service.

A trend, commented on in this column early this year, of labor unions demanding a right to share increased profits has now become so general that further comment is superfluous. Those of us who were schooled to believe that profits were the reward of capital for its foresight and assumption of risk must now modify our economics to the extent that we accord labor not wages alone, but wages with a firm impenetrable base and a ceiling limited only by the top of the profit chart, if any. It is quite probable and possible that closed shop agreements may crumble with the return of hard times, although closed shop demands are prominent in labor negotiations today. Far more fundamental in labor economics is the base wage doctrine and the share-the-profits philosophy. This opinion is offered not as an abstraction, but as a com-

FOSDICK



JIG
BORER

PRECISION BUILT

for

PRECISION BORING

● Greater production . . . accurate work . . . versatile operation . . . medium investment—sums up in a few words the advantages of the Fosdick Jig Borer. ● Because it does not require a heavy outlay to put one of these machines to work many of the smaller shops are using them to machine small lots economically on work that would ordinarily require costly jigs and fixtures. ● A machine of

this type also enables you to make changes and improve design without going to the expense of purchasing new tools and fixtures and allows you to compete favorably with large manufacturers. ● There are a host of drilling and boring operations that can be done most economically on the Fosdick Jig Borer. ● Built in two sizes Number 30, 18 x 36 and Number 30-A, 22 x 44 inches.

FOR COMPLETE DETAILS
CONSULT US . . . BULLETIN
J.B.A. UPON REQUEST. WRITE.

FOSDICK MACHINE TOOL COMPANY
CINCINNATI - OHIO

NEWS OF THE WEST COAST

ment on Pacific Coast labor negotiations during the first eight months of 1941.

MATERIAL shortages at Coast shipyards were reduced last week. Richmond Shipbuilding Corp., Richmond, Cal., was able to lay keels for three Maritime Commission EC 2's with the expectation that the hulls would be launched in five weeks.

In southern California, California Shipbuilding Corp. has been struggling to overcome 10 to 15 types of miscellaneous shortages. A large machine shop has enabled this shipbuilder to make many of its own tools, and special scouts have been able to turn up enough used tools to avoid acute scarcity.

Los Angeles, like other Coast cities, has depleted plate stocks,

and a shortage of small tools, welding rods, and similar equipment.

North American Aviation begins construction this week on a new engineering building, an advanced production building, and an elaborate wind tunnel. The engineering addition will provide for doubling of the firm's engineering personnel. Machine facilities to be installed in the advanced production building will represent "a 150 per cent gain over present equipment," according to the company. The wind tunnel unit will be 75 by 171 ft. and will stand 30 ft. high. An air blast at a maximum speed of approximately 320 mph. will be driven through the tunnel proper by a 19 ft., five-bladed propeller, powered by a 1250 hp. synchronous motor. The tunnel is to be of the single return flow type with four 90 degree

bends. Guide vanes will be used in each bend. The rectangular throat of the tunnel will be $7\frac{3}{4}$ ft. high and 11 ft. wide.

Contract was let last week for the construction of the \$63,000,000 government financed magnesium plant near Boulder Dam to be operated by Basic Magnesium Inc. of Cleveland. Power requirements of the new plant will amount to nearly one-third of the Dam's putput. Eventually, power from Boulder is expected to be supplemented by Parker Dam power plant and the proposed Davis or Bullhead plant which would be constructed on the Colorado River. Completion of the magnesium plant is scheduled for Sept. 1, 1942. This project, located in desert country, is another which creates a labor supply problem. The plant

PRIORITIES HOLE: A block square project for this Union Square underground garage, and terraced surface park at San Francisco has been halted probably for several years, because steel and other needed materials, according to the contractors, are being withheld by priority allocations.

Photo by AP



will employ approximately 7500 men, and an entire new city will be built to house them.

THE Office for Emergency Management has announced that national defense contracts for the Pacific Coast during the first 10 days of September totaled \$370,573,947.00. Topping the list were two contracts with Boeing Aircraft Co., Seattle, totaling \$337,447,059.00 for airplanes and spare parts. Douglas Aircraft Co. was awarded a contract for \$9,709,616.00 for airplanes and spare parts.

Iron ore investigations of the United States Bureau of Mines are extending into Arizona, Montana, Nevada, Utah, Idaho and Washington, the Western headquarters of the Bureau at Tucson, Ariz., stated last week. Bids were opened last Thursday for extensive diamond core drillings in the strategic Eagle Mountains of southern California.

"Spirit" of Pig Iron Order M-17 Observed

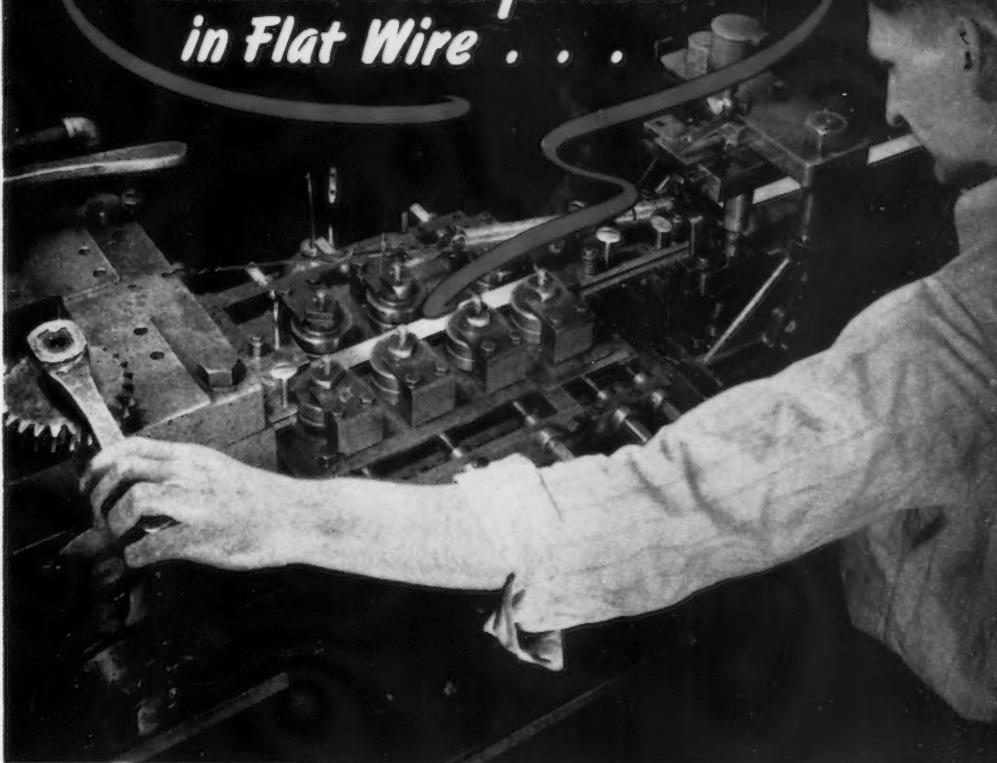
• • • Revealing that OPM has ruled charcoal pig iron is not under mandatory delivery control, a Middle Western producer has advised customers that nevertheless: "We will observe the spirit of pig iron order M-17.

"We will expect your cooperation so that your inventory will not exceed a 45-day supply," the company wrote its trade. "We will require that you file with us promptly after the first of each month OPM form PD-19-a, but it will not be necessary to file a duplicate with OPM. Without this form we will not ship. On your form PD-70 which you file by the 15th of each month with OPM, do not include charcoal pig iron figures. However, somewhere on PD-70, the OPM requests you indicate the actual amount of charcoal iron ordered for the month for which the report is filed."

Charcoal pig iron remains under price control, of course.

On other types of pig iron, delivery control has been working fairly well in the East, except that in the initial month's allotments not enough consideration was paid by OPM to grades. Malleable foundries and others using numerous grades, feared that by the end of the month inventories would be top heavy in some grades and insufficient in others, causing production losses.

THOMAS Uses Precision Methods to Assure Maximum Straightness in Flat Wire . . .



EXTRA QUALITY in Thomastrip is obtained by supplementing many customary mill operations with various special processes.

The illustrated machine, used after rolling operations, straightens, flattens, and assures a minimum of camber in Thomas flat wire. Special annealing equipment enables Thomas to meet specifications accurately and maintain uniform temper. Thomas has facilities to fur-

nish long-length coils which eliminate frequent threading into forming machines and hence saves valuable time. Since special attention is paid to quality of high rank, as well as small but important details, Thomas customers can make better finished parts with faster production.



THE THOMAS STEEL CO., WARREN, O.
SPECIALIZED PRODUCERS OF COLD ROLLED STRIP STEEL

Fatigue Cracks

BY A. H. DIX

Take a Long Breath

• • • R. L. Odiorne, of the Ralf Kircher Co., Dayton advertising agency, sends us a postcard from the Whitaker Reel Mfg. Co., West Monroe, La., that establishes a new non-stop adjective record. It reads:

... why not use improved wire reels that operate vertical and horizontal? The Whitaker all-metal non-wobble self-attended accurate adjustable pay-out take-up wire reel with automatic brake operated by out-going wire is just such a reel.

Bottle Blowers and Earth Eaters

• • • Speaking of ten-dollar words, if you know one, sooner or later you will uncage it. As Al Smith says, the fellow who takes the trouble to lug a harp to a party is going to play it whether invited to or not.

Recently, for instance, we mentioned our delight at learning that there is even a word for the sound made by blowing across the mouth of a bottle. The word is *amphoric*, but it is hard to work into casual conversation. John (Bethlehem Steel) Long, author of "*Mr. Pitt and America's Birthright*," says:

You complain that others tend to ignore the word when you use it. The trick is to personalize it. Say, "You sound amphoric to me," or, "Your intonation is amphoric." Immediately the person addressed is eager to know whether he or she is being complimented or insulted. The whole procedure is likely to lead to a conversation which may become esoteric or even bizarre.

There is, of course, the danger that the person the word is used on may be the thin-skinned, silent, injury-harboring type, and when you are up for membership in the exclusive Northside Chowder and Shuffleboard Club you find yourself torpedoed.

The dictionary is full of words that are still in the original cellophane because the opportunities to use them are so limited. There is even a word for people who eat earth. They are known as *geophagists*. Here you have an extremely limited field of application, for you can go for days without meeting an earth eater.

Your best bets are children about two years old. Observing one with dirt around his mouth you could say to the mother, "Lady, your child appears to have geophagous tendencies." But likely as not the word would misfire and the mother would beam, and answer, "We noticed it, too, and when he gets old enough we are going to let him take lessons."

Four Times at Bat, Four Hits

Last week we hinted in bold face type that your favorite family journal might be in line to get a prize for editorial achievement in the annual contest conducted by *Industrial Marketing*. It happened, and we are delighted but not surprised. The article chosen was "Armored Steel," by Thomas Wendell Lippert, our managing editor, published in the March 6, 1941, issue.

In each of the four years the contest has been held your favorite family journal has been among the winners. If we are not the only publication to have a perfect record we apologize in advance.

"Oh, Give Me a Home . . ."

• • • Being content to let the general magazine convince you that the Army and Navy spend their time demonstrating the comparative lengths of cigarettes and that Kreml will keep that bald spot from becoming common knowledge, we reject advertising which, in the stately language of form letter No. 37, is not germane to our field.

But this week we broke a rule, and in the classified advertising section a cattle and sheep ranch is offered to you. When the ad first came in we expressed disinterest, but the advertiser pleaded, and we gave in only because we were flattered that he should think your yearning for free life, free air, and a canter after the cattle should be intense enough to run into seven figures.

We Muddled Our Mandarin

You quote a Chinese saying, "Ni tung wo si," as meaning "I East thou West" . . . You appear to have interchanged the meanings of "ni" and "wo" respectively. Writing it phonetically in the Mandarin pronunciation, "nee toong waw shee" means You East I West, and for your future reference, the characters (from left to right as in English) look something like this:

你 東 我 西

—J. M. Sheehan,
United States Navy Yard, Philadelphia

• • • The erudition that lies under the scalps of this page's army of eighteen loyal readers stuns us. But what we really need are the Cantonese characters for "Very little starch in the soft shirt collars."

Naval Orchids

• • • A lot of letters are coming in from Navy people these days. An Eastern seaboard navy yard officer writes:

My congratulations on your editorials. They are outstanding—in the field of daily reading of such scope as comes to me in the household and in line of duty.

And a former factory manager of an Iowa plant who is now on active duty as a naval officer assigned to a Mississippi shipyard says:

I am certainly enjoying The Iron Age. It's great for keeping posted on industry in general, an otherwise difficult task in such a specialized business and small town as this. The "Assembly Line" is my favorite haunt and my "crystal ball."

With the industry rapidly becoming a huge arsenal our mail is full, too, of letters from the Army. The War Department squawks because a recent issue is late in coming in and says, "Please send it at once, as we need it for reference." The Frankford Arsenal wants an article on continuous casting. The Air Corps writes for a series on copper brazing. The War Department's Under Secretary writes for a chart on corrosion-resisting properties. The Chief of Ordnance's office asks for a postwar prognostication. Our letter carrier's legs are becoming parenthetical under the weight of mail from plants with defense contracts.

All in all, we would be among the last to deny that your favorite family journal is one of the more important vertebrae in the armament program's spine.

Stoppers

The brush that helped boost the bomber birth rate—Osborn Mfg. Co.

Every spindle nose should have its "handkerchief"—Cushman Chuck Co.

What the well-dressed fowl will wear

—Continental Steel Corp.

Saved. 50,000 barrels of beer—Allis Chalmers.

Puzzles

Last week's divisor was 125473 and quotient 58781. Lt. Com. A. R. Simpson and Robert T. (Pittsburgh Tool Steel Wire Co.) Griffiths slowed the Sept. 11 cerebral cyclone down to a summer breeze. The motorboat heads upstream at a 26 1/3 deg. compass course. The current brings the true path of travel to 38 deg., 8.07 miles. The swimmer sets his course due East, but the current makes his actual course 239 deg. He swims 9.718 miles. Total time, 2 hr. 25 min.

Par for this depilator, sent in by the Lt. Com., is 80 min.; Towns A and B, 25 miles apart, are both due South of a railroad that runs straight from East to West. Town A is 5 miles due South, and B is 20 miles due South. It is desired to build a highway from A to B and have it touch the railroad. What is the shortest possible route for the highway? What is its length and point of contact with the railroad?

The combination of unusual flexibility, exceptional ease of control and high economy gives the Hi-Lift Hoist a wide usefulness. Sturdy construction makes it always reliable.

The load, large or small, is under the accurate control of the operator. He can lift, carry and spot with precision.

Hi-Lift Hoists are in use in every type of industry—steel mills, automobile plants, foundries, machine shops, tool and die shops, paper mills, structural plants, power plants and many other places.

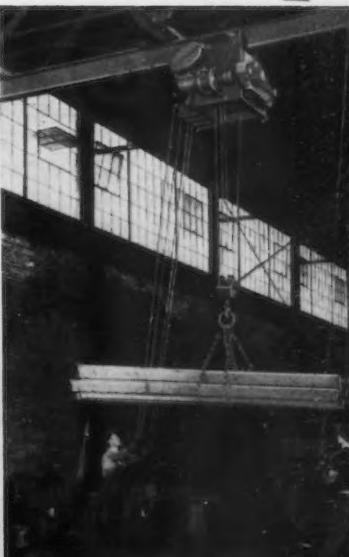
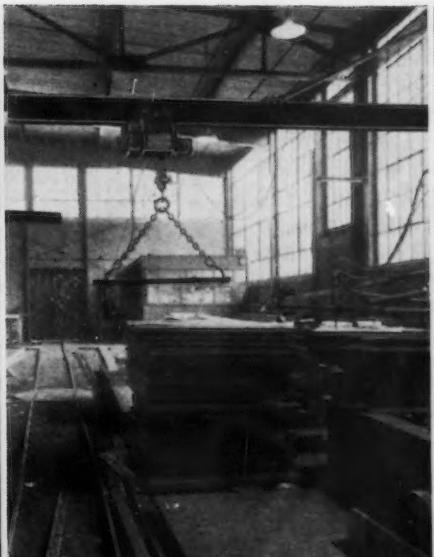
They are handling dies, castings, machinery, steel, paper, electrical material, automobile bodies and frames, lumber, stone, pipe, etc., at amazingly low costs, and with the high-lift feature are making better use of building space.

The Hi-Lift line is comprehensive —there is an economical unit to meet YOUR needs.

Northern HI-LIFT HOISTS

serve manufacturing,
storage and shipping
operations at less cost

NORTHERN ENGINEERING WORKS
55 Atwater Street
Detroit, Michigan



Typical Applications of Northern Hi-Lift Hoists in Various Industries

This Industrial Week . . .

• • •

SMALL metal-working plants in the U. S. this week found themselves growing in importance in relation to the national defense program. More people, including government defense agencies, appeared to be more concerned whether such plants get into production of war goods, whether they obtain materials, whether they stay in business.

But this week, as for many months, companies which are too small to take prime defense contracts, or which haven't

**Its Gears
Are Clogged**
all the necessary equipment, the skilled workmen or the

necessary financing advantages, for the most part remained skeptical. "The gears are clogged," one small company executive told THE IRON AGE at the subcontracting clinic just ended at the Grand Central Palace, New York. "Everywhere I turn there is red tape and one gets a feeling something is wrong. I just talked to a priorities official who has been working a long time but hasn't been paid yet. He's sore about that. I wanted to know if I could get material. He couldn't assure me, but he advised filling out a PD-1 and I suppose in six months I'll know whether I'm in business or not."

Floyd Odlum, head of the new OPM Division of Contract Distribution, in emphasizing a point that heads of small [and some not so small] non-defense plants all

over the country understand, noted this week that "small business wants work, not conversation."

**More Work,
Less Talk**

versation. Large plants equipped to do the more difficult work should pass on to the smaller plants the simpler work which they in turn are equipped to do. Thus the bottlenecks will be removed and all will be kept busy." That is the problem—to keep everybody busy. Some in industry are keeping busy, the machine tool plants for example, reporting that in August machine tool shipments, virtually all for defense uses, rose to \$64,-

300,000, the highest in history. This represents a 40 per cent rise over the August, 1940, total of \$40,800,000. The \$64,300,000 represents work actually done not "earmarked, or appropriated or awarded."

Reflecting the activity of steel plants, U. S. blast furnace consumption of iron ore in August reached a new record of 6,393,215 gross tons, bringing total consumption for 1941 through Sept. 1 to 48,681,413 gross tons, an unprecedented high mark. Winter ore reserves at U. S. furnaces have now been built up to 31,330,782 tons, compared with 27,333,285 tons a month earlier. Steel plant operations this week are estimated by THE IRON AGE at 97.5 per cent of capacity, up a half point from last week's revised figure of 97 per cent. The increase was due to stronger operating schedules in the Pittsburgh, Chicago, Philadelphia and Southern Ohio River areas. Some loss of steel was reported in a Kansas City plant where production was stopped temporarily because of a utility company strike.

In September steel orders taken by various producers have run from 30 to 45 per cent below the volume booked in August, but even at this reduced rate new

business has equaled shipments, resulting in no reductions in backlog. An analysis of incoming business, most of which is either directly or indirectly for defense, suggests that steel consumers requiring material for non-essential uses can expect little or no steel,

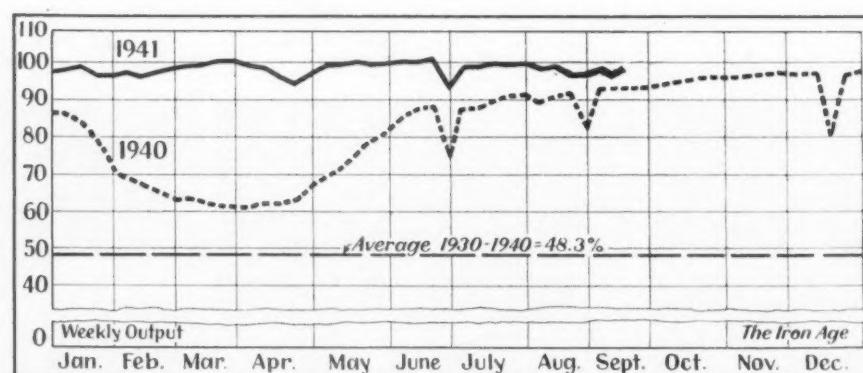
at least for a time. The volume of priority ratings issued by the OPM for steel uses indicates that soon all orders will be "rated" tonnage.

Steel plates remain a problem, although shipyards, both naval and private, have been for the most part cleared of charges that they are hoarding material. A check of private yards on the east coast showed little piling up of material, while the Navy Department has sent representatives on a tour of plate mills to speed production and rearrange schedules permitting shipments to yards where stocks are low. Meanwhile, the heavy volume of A-1-a preference ratings on such items as plates and shapes has pushed back delivery on other steel orders with lower preference ratings which, by a common sense yardstick, are just as important. For example: The OPM has insisted that more steel

Most Steel To Be "Rated"

Steel Ingot Production—Per Cent of Capacity

(Open Hearth, Bessemer and Electric Ingots)



Steel Ingot Production, by Districts—Per Cent of Capacity

	Pitts- burgh	Chi- cago	Val- ley	Phila- delphia	Cleve- land	Buf- falo	Wheel- ing	De- troit	South- ern	S. Ohio River	West- ern	St. Louis	East- ern	Aggre- gate
Current Week....	98.0	101.0	97.0	91.5	93.0	104.5	91.0	106.0	96.5	102.0	98.0	101.0	103.0	97.5
Previous Week....	97.0*	100.0	99.0	91.0	96.0	104.5	91.0	106.0	96.5	97.0	98.0	105.0*	102.0	97.0*

* Revised

be used for freight car plates, which have an A-3 rating, during September and October than for other plate requirements with a higher rating. Such distribution difficulties will have to be settled by the OPM.

While steel plants and many hundreds of steel consumers are straining for still higher production, in answer to pleas like that of William S. Knudsen, OPM Director General,

for overtime work for all, the strike still seems to be regarded as a luxury which the country can afford, even in a

defense plant. An outlaw strike of SWOC millwrights, machinists, boiler makers and welders, settled on Tuesday, has caused a full week's shutdown at Carnegie-Illinois Steel Corp.'s McDonald [Ohio] bar and sheet mills. Loss of production which cannot be made up because the mills were previously working at capacity, is estimated at 26,000 tons of finished steel products. The dispute—one of those getting little publicity but which are quietly cutting away at the national defense program—started when some skilled workmen walked out in protest against the hiring of apprentices and stopped production on structural shapes, universal plates, strip steel, reinforcing bars and other items which are greatly in demand for defense purposes.

Last week complete allocation was made of approximately 280,000 tons of steel for October

**280,000 Tons
For Britain**
and November delivery to the British. Of this amount approximately 50,000 tons were slabs, 60,000 tons billets, and about 150,000 tons ingots. Since the British are not accepting bessemer ingots, the furnishing of open-hearth steel ingots for export will continue to affect production of American bar mills.

This week's awards of reinforcing steel call for 16,700 tons and include 6000 tons of Azusa, Cal., for the Santa Fe Dam, 4000 tons at Marion, Ill., for the Crab Orchard Ordnance Works, and 3000 tons for a fleet operating base at



FROM CRETE TO CALIFORNIA: Damaged by an aerial bomb in the Battle of Crete, the British cruiser H.M.S. Liverpool is shown above undergoing repairs in the U. S. Navy Yard at Mare Island, Cal.

San Pedro, Cal. Fabricated structural steel awards total 32,900 tons, against 15,600 tons last week, and include 18,000 tons for four warehouses at Burns City, Ind. Other siz-

**Structural
Awards Up**
able lettings were 3500 tons for the Navy base at San Pedro, Cal., and 2286 tons for a lift bridge at the Philadelphia Navy Yard.

Almost one million tons of steel rails needed to replace wornout trackage in 1942 have either been ordered or allocated to various companies. This tonnage represents the greater portion of 1942 requirements. The mills are interpreting steel rails which are for specific replacement of wornout material to come under the general classification of repairs and maintenance and an A-10 rating is being assigned to such requirements. Reinforcing bar makers this week, remembering that their plants are running almost 100 per cent for national defense, including munitions plants and other direct defense needs, reflected, wide-eyed, on the 22,500 tons of concrete bars which are required by the War Department for construction of a new office building at Washington. Likewise, concrete bar makers have received inquiries in the past week for 80,000 tons of concrete bars to be used in construction of concrete barges. On

the west coast, where concrete bar demand has been taxing all available facilities, the Bureau of Reclamation has been attempting to buy 8000 tons of concrete bars for work at Odair, Wash.

Hanging over each order placed for steel or other metals these days is the question—is this the use to which the tonnage can best be put from the viewpoint of national defense. Modification of raw material controls and priorities was proposed this week by Walter

B. Weisenberger, NAM executive vice-president, as one way to permit small non-defense plants to stay in business. Small allotments of material would keep going 75 per cent of an estimated 116,500 non-defense plants in the country, the NAM executive said. A great steel tonnage, which may not be distributed for urgent defense needs, is called for in the giant 1820-mile crude oil pipe line sponsored by Oil Administrator Ickes. Turned down on one request for priorities covering construction of the line with all plates and on another request providing for its construction with half plates and half seamless tubing, Mr. Ickes' associates are said to suggest that the line be built entirely of seamless tubing, calling for more than 400,000 tons.

*"You might say I took out
High Speed Steel Insurance!"*



★ Changing over to DBL High Speed Steel is just about the finest protection any user of cutting tools can get.

DBL complies with OPM orders, protects you against tungsten shortage and aids the nation's conservation program for defense, because it contains less than one-third as much tungsten as "18-4-1" High Speed Steel.

It protects you against loss of production, because in 85-90% of all cases, it performs

just as well and frequently better than 18-4-1. And it protects you against buying any new equipment or learning new techniques, because it heat-treats in exactly the same equipment and by the same methods as 18-4-1.

Solve your High Speed Steel problems, once and for all, by changing over to DBL. All you need is the DBL "Blue Sheet," which contains full technical data. *Mail the coupon below for your copy.*

ALLEGHENY LUDLUM

STEEL CORPORATION

Tool Steel Division



PITTSBURGH, PA.

Waterloo, N.Y.

Allegheny Ludlum Steel Corporation
Oliver Building, Pittsburgh, Penna.

T-23

Send me a copy of the "DBL Blue Sheet."

NAME _____

COMPANY _____

ADDRESS _____

News of Industry

Need of Financing

Small Plants Seen At New York Clinic

By DON R. JAMES

• • • The subcontracting problem needs the benefit of more forceful direction and is nearing the point where facilities for small plants may have to be financed on an increasing scale, it seemed evident early this week at Grand Central Palace, New York City, where "primes and subs" came together from over the nation.

Sitting at long rows of tables were some 150 prime contractors, representing millions of dollars worth of defense business. Their production limits had been reached and they were seeking additional facilities, or better facilities, for the parts they displayed. Passing by last Monday morning were some 700 executives looking for work and feeling that somehow their facilities ought to fit into the defense program. Some were desperate; a few were resentful over being forced out of non-defense output; others were badly confused over priorities, and some were doubtful of their ability to produce. Many already held subcontracts which were nearing completion.

Most of the small plant operators said work was needed for the whole shop instead of one or two departments. The load at present is very uneven. Short runs and close tolerances on aircraft work are headaches. Negotiated busi-



PRIMES MEET SUBS: At Grand Central Palace in New York last Monday 700 hopeful plant operators viewed parts which 150 prime defense contractors offered for farming out. The clinic, largest of its kind yet held, continued for three days, and was scheduled to attract thousands of executives. Forgings which American Locomotive Co. had on hand are shown in one of these pictures, and are being examined by prospective subcontractors. In the other view, parts exhibited by Hamilton Standard Propellers division are being examined by four representatives of Otis Elevator Co. who were looking for subcontracts.

ness is preferred instead of the bid procedure which was desired by some primes at the clinic. Erection of assembly plants which could be used by groups of small subs is believed well worth earnest consideration. More impetus from the top is desired in working out arrangements for the pooling of machines.

On the question of priorities, numerous small plant operators who were interviewed felt that defense has not been defined broadly enough, making production on semi-defense items increasingly difficult. On the other hand, some operators indicated there are "ways" of obtaining ample ma-

terial and expressed confidence that they would feel no shortages whatever before next January.

Other aspects of the priorities picture included: Red tape growing worse. One individual said a contract is difficult to close without a priority and at the same time it is impossible to obtain a rating without a contract, leading to the suggestion that more division between contracts and priorities would be welcome.

To an increasing extent, small operators are desirous of making certain they can get the material before accepting a contract. Before taking any action they are beginning to contact as many

advisory sources as possible; before shipping out of stock they are making certain of replacements. They are beginning to realize that unless given a clear picture, authorities err innocently.

Floyd Odlum, head of the new OPM contract division, told the New York assemblage Monday that, "Small business wants work, not conversation. Large plants equipped to do the more difficult work should pass on to the smaller plants the simpler work which they in turn are equipped to do. Thus the bottlenecks will be removed and all will be kept busy."

Odlum's statement jibed with the views held by many small operators who made the rounds of the tables that same morning.

"Although I need work badly, I'm not getting anywhere because the class of work exhibited here is beyond the ability of my equipment," said one man from near Albany, N. Y. "This has happened at two other clinics. I'll keep on with non-defense work. I know how to get the necessary material."

OPM officials who attended the clinic in force, with representatives of all the other principal defense agencies such as the Army, Navy, or Maritime Commission, agreed that small operators are having a tough time, but said the government recognizes the problems which must be met.

"Their plants can't afford the technical staffs necessary even to know how much they can produce these defense items for," said OPM. "They have no assurance they can get machinery. And because the overhead on a small plant is relatively greater, they may not be able to make a given product for as low a price as can the big plant."

We plan to spread defense work further. The labor division of OPM will investigate whenever a community is threatened by shutdowns or layoffs of any non-defense plant. The new CDS, headed by Floyd Odlum, will assign its engineering and technical experts quickly to fit the new plant into defense. OPM then will certify the facts it finds to the War and Navy departments.

"The secretaries of War and Navy issue 'special directives' to their purchasing division, authorizing them to negotiate contracts

Directory of Offices, For Priorities Field Service of the OPM

Boston—30 Pearl Street; W. P. Homans, district manager.
New York City — 25 Broad Street; P. L. Salussolia, acting manager.
Dallas, Tex.—Wood and Alkard Streets; James B. Crockett, district manager.
Detroit — 160 Forest Street, West; Walter Hall, district manager.
Philadelphia — 925 Chestnut Street; Fred W. Slack, district manager.
St. Louis — 411 Locust Street; Louis E. Crandall, district manager.
Chicago — 230 So. La Salle Street; Warren G. Bailey, district manager.
Cleveland—East Sixth and Superior; William T. Walker, district manager.
Denver — 17th and Arapahoe Streets; Virgil Board, district manager.
Pittsburgh — Grant Street and Ogle Way; Charles Cruciger, district manager.
Atlanta—Federal Reserve Bank Building; John B. Reeves, district manager.
San Francisco—Federal Reserve Bank Building; A. L. Kerr, district manager.
Cincinnati—Union Trust Building; Bruce W. Burroughs, district manager.
Seattle—Stuart Building; William D. Shannon, district manager.
Los Angeles—1151 South Broadway; G. Howard Hutchings, district manager.
Kansas City, Mo.—Federal Reserve Bank Building; Clifford H. Carr, assistant district manager.

who has been working a long time but hasn't been paid yet. He's sore about that. I wanted to know if I could get material. He couldn't assure me, but he advised filling out a PD-1 and I suppose in six months I'll know whether I'm in business or not."

On the other hand, the president of an Elmira, N. Y., shop who with his wife, attended several clinics in western New York state, reported fair success in finding work. The priorities confusion will lead to the flouting of regulations on a wider scale, he said.

Lieut. Gov. Charles Poletti of New York State told the crowd, "America has been too slow in adopting the bits and pieces program. There have been too many speeches and not enough action."

Mayor La Guardia of New York asserted, "It will not be enough to produce the original defense program on time. If we can't do it quicker, it will be disastrous. England has met the situation and is utilizing every small shop."

La Guardia appealed to the Army and Navy, "who are rigid in their habits, to adjust the giving of their contracts to speed up the farming out work."

Up to noon on Monday, one big aircraft engine maker reported receiving four prospects out of the hundreds who had filed by his table. One prospect was from Chicago, another from Ohio. All were small shops, and one was able only to do part of the job without finishing it. All will be called upon and investigated thoroughly by the prime contractor before further negotiations.

Among the items on display at the clinic were some costing many thousands of dollars to tool. A propellor part being produced on subcontract by a Cleveland metalworking concern, and costing \$30,000 to tool, was on exhibit in the hope that more subs could be found. Over nine months were required before the Cleveland subcontractor began furnishing really good parts.

"We have saved 700 letters and consequent replies by attending recent clinics," said a representative of another prime contractor. "The subs eliminate themselves as they file by here, and if we get 12 good prospects after three days

What Priorities Mean—Which Forms Apply

Description of OPM orders and related forms affecting the metal and metal products industries as of Sept. 22, 1941

Definition of principal orders: M order—general preference order to control distribution of a material at its source. It can, for example, (1) place all shipments of a material under control of the Director of Priorities, (2) direct producers to favor defense orders, set up an emergency pool, and allow balance of output to go free as producers

determine, or (3) control usage through control of rate of production. P order—preference rating order giving a buyer a rating to procure material and equipment for the manufacture of specified products. E order—an order controlling the distribution of equipment.

THE IRON AGE

(After locating priority order covering your needs, find the related form designation and turn to bottom listing for description of forms.)

OPM Priorities Order Number	Defense Material or Equipment Covered	Number of Form to Use	OPM Priorities Order Number	Defense Material or Equipment Covered	Number of Form to Use	OPM Priorities Order Number	Defense Material or Equipment Covered	Number of Form to Use
AIRCRAFT								
P-13	Airframes (Models SB-2-c and SO-3-C)	PD-52 PD-52-a PD-13	P-2-m	Machine tools, assigns preference rating A-1-a	Machine tools, assigns preference rating A-1-a	M-5-b	Stainless Steel, Nickel Bearing, defines, and gives percentage use of primary nickel to total nickel content (revoked, now covered by M-21-a)	PD-69 PD-70 PD-73
P-3	Airframes (not including engines and propellers) Assigns preference rating A-1-d		E-I	Machine tools, directs distribution of existing and prospective supply. Issued simultaneously with Preference order No. P-2, Materials for production of machine tools		M-21	Steel, directs distribution	
P-9-a	Airframes for heavy bombers	PD-43 PD-43-a	PD-47	Machine tools, assigns preference rating A-1-a	Machine tools, assigns preference rating A-1-a	M-21-A	Steel, amends M-21, contains specific regulations concerning alloy steel and iron and wrought iron	
P-9-e	Bomb Sights	PD-47-a	E-I Amend.	Machine tools, amendment to machine tools order to conserve the supply and direct the distribution	Machine tools, establishes the order which producers of machine tools must follow in deliveries to defense contractors.	SDO-1 Amend.	Steel, amendment to general steel preference delivery order No. I which provides: (1) Submission of PD-32 Revised to Priorities Division by customers if deliveries are deferred or rejected; (2) That PD-32-a Revised, issued on producer's required sworn statement must be returned in five days; (3) Producers issued PD-32-a Revised, required to transmit all records etc., for inspection by	
P-6-a	Civilian. Assigns A-10 rating Engines for heavy bombers	PD-44 PD-44-a	PD-14	Machine tools, assigns preference rating A-1-c	Machine tool parts, assigns preference rating A-1-a	PD-42		
P-9-b				Gun Fire Controls and Bomb Sights	Metal working equipment, assigns preference rating A-1-a, A-1-b and A-1-c to items included in Exhibit A	PD-42-a		
P-4	Engines and Propellers. Assigns preference rating A-1-c	PD-47-a	PD-46	Gun Turrets for heavy bombers	Metal working equipment and testing equipment, power			
P-9-e	Propellers for heavy bombers	PD-45	P-2-s					
P-9-d	Turbo Superchargers for heavy bombers	PD-45-a PD-48 PD-48-a	P-11					
P-9-c								
P-9-f								
ALUMINUM								
M-1	Directs distribution	PD-8 PD-26	P-2-r					

After locating priority order covering your needs, find the related form designation and turn to bottom listing for description of forms.

Priority Order Number	Defense Material or Equipment Covered	Number of Form to Use	OPM Priorities Order Number	Number of Form to Use	OPM Priorities Order Number
AIRCRAFT					
P-13	Airframes (Models SB-2-c and SO-3-C)	PD-52	P-2-m	Machine tools, assigns preference rating A-1-a	M-5-b
P-3	Airframes (not including engines and propellers) Assigns preference rating A-1-d	PD-52-a PD-13	E-1	Machine tools, assigns preference rating A-1-a	
P-9-a	Airframes for heavy bombers	PD-43 PD-43-c PD-47 PD-47-a		Machine tools, directs distribution of existing and prospective supply. Issued simultaneously with preference order No. P-2, Materials for production of machine tools	M-21
P-9-e	Civilian. Assigns A-10 rating Engines for heavy bombers	PD-44 PD-44-a PD-14	E-1 Amend.	Machine tools, amendment to machine tools order to conserve the supply and direct the distribution	M-21-A
P-4	Engines and Propellers. Assigns preference rating A-1-c	PD-47	E-1 Sup. I	Machine tools, establishes the order which producers of machine tools must follow in deliveries to defense contractors.	SDO-I Amend.
P-9-e	Gun Fire Controls and Bomb Sights	PD-47-a			
P-9-d	Gun Turrets for heavy bombers	PD-46-a			
P-9-c	Propellers for heavy bombers	PD-45 PD-45-a	P-2-s	Machine tool parts, assigns preference rating A-1-a	
P-9-f	Turbo Superchargers for heavy bombers	PD-48 PD-48-a	P-11	Metal working equipment, assigns preference rating A-1-a, A-1-b and A-1-c to items included in Exhibit A	PD-42 PD-42-a
ALUMINUM					
M-1	Directs distribution	PD-8 PD-26 PD-39 PD-40	P-2-r	Metal working machines and testing equipment, power driven, assigns preference rating A-1-a	
M-1-a	Schedule of preference ratings under M-1		P-2-I	Nibbler, assigns preference rating A-1-a	SDO-I
M-1-b	Modifies M-1 and M-1-a with respect to deliveries of low grade aluminum		P-2-o P-2-l	Spindles, and hydraulic cylinders, assigns preference rating A-1-a	
M-1 Ext.	Extends M-1, M-1-a and M-1-b to Dec. 31, 1941		P-2-f	Tapping Machinery and die heads, for shells, assigns preference rating A-1-a	M-5
P-12	Scrap. Assigns preference rating A-10		P-2-r	Testing equipment, power driven, assigns preference rating A-1-a	
M-1-c	Scrap and secondary aluminum. Directs distribution				M-5 Amend.
MAGNESIUM					
	Supplements M-1 and M-1-a				
	Forms (Revised)				
	Provides definitions of certain terms				

...
provides definitions of certain
terms (Revoked, now covered
by M-21-a)

Amend.

MAGNESIUM

To direct distribution
Supplements M-2
Extends M-2 to Sept., 1941

M-2
M-2-a
M-2
Ext.

Directs distribution and con-
serves supply
PD-53-a
PD-53-b
PD-54
PD-55

Amends M-18

CHROMIUM

Stricken from General Met-
als Order No. 1

Amend.

NICKEL

Directs distribution
Nickel bearing steel, directs
distribution (Revoked, now
covered by M-21 and M-
21-a)

M-6
M-5
M-5

Amends M-18

NICKEL

Amend.

Nickel bearing steel, pro-
vides definitions of certain
terms (Revoked, now cov-
ered by M-21 and M-21-a)
Nickel bearing steel, supple-
ments M-5. Establishes pref-
erence rating and allocation
schedules (Revoked, now cov-
ered by M-21 and M-21-a)

M-5
Amend.

COPPER

Direc's distribution
Amends preference order
M-9, provides information on
(1) pool (2) shipments, and
(3) toll agreements
Supplements M-9, Revokes
M-9 Amend.

M-9
Amend.

CHROMIUM

Stricken from General Met-
als Order No. 1

Amend.

CHROMIUM

Alloys and Fabricated Prod-
ucts. Extends preference or-
der M-9 on copper
Alloys. Stricken from Gen-
eral Metals Order No. 1

Amend.

CHROMIUM

Assigns preference rating
A-1-a. Revokes order No.

CHROMIUM

P-1

CRANES

Electric Traveling. Assigns
A-1-c rating to material for
production

CRANES

P-5

CRANES

Assigns preference rating
A-1-a. Revokes order No.

CRANES

P-1

CRANES

Amendment No. 1 to Gen-
eral Preference Order No. P-
5, to include hydraulic

CRANES

P-5

CRANES

Locomotive repairs, for
steam, electrical or diesel
locomotives for railroad,
mining or industrial use.

RUBBER

Locomotive repairs, for
steam, electrical or diesel
locomotives for railroad,
mining or industrial use.

RUBBER

P-21

RAILROAD EQUIPMENT

P-8

RAILROAD EQUIPMENT

Freight car construction, in-
cluding railroad, industrial
and mine freight cars. As-
signs preference rating A-3

RAILROAD EQUIPMENT

P-20

RAILROAD EQUIPMENT

Locomotive repairs, for
steam, electrical or diesel
locomotives for railroad,
mining or industrial use.

RAILROAD EQUIPMENT

P-21

RAILROAD EQUIPMENT

Ferrotungsten metal powder
and tungsten compound, ex-
tends M-3 and M-3-a to
Aug. 31, 1941

RAILROAD EQUIPMENT

P-21

RAILROAD EQUIPMENT

Ferrotungsten metal powder
and tungsten compound, ex-
tends M-3 and M-3-a to
Aug. 31, 1941

RAILROAD EQUIPMENT

P-21

RAILROAD EQUIPMENT

M-3 and
M-3-a
Ext.

RAILROAD EQUIPMENT

M-3 and
M-3-a
Ext.

RAILROAD EQUIPMENT

M-23
GMO
No. 1
Amend.

RAILROAD EQUIPMENT

Stricken from General Met-
als Order No. 1

RAILROAD EQUIPMENT

Amend.

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ALUMINUM	Directs distribution	PD-8 PD-26 PD-39 PD-40	P-2-r	Metal working machines and testing equipment, power driven, assigns preference rating A-1-a	SDO-I	Items included in Exhibit A
M-1	Schedule of preference ratings under M-1 Modifies M-1 and M-1-a with respect to deliveries of low grade aluminum	P-2-I P-2-o P-2-I	P-2-f	Nibbler, assigns preference rating A-1-a Spindles, and hydraulic cylinders, assigns preference rating A-1-a Tapping Machinery and die heads, for shells, assigns preference rating A-1-a Testing equipment, power driven, assigns preference rating A-1-a	Steel, general preference delivery order, covering pig iron, ferro alloys, steel ingots and castings, and all carbon and alloy steel products	PD-32 PD-32-a
M-1-a	Extends M-1, M-1-a and M-1-b to Dec. 31, 1941	P-2-r	M-5	Steel, Nickel Bearing, directs distribution (Revoked, now covered by M-21-a)	Steel, Nickel Bearing, directs distribution (Revoked, now covered by M-21-a)	PD-10 PD-11 PD-17 PD-18
M-1-b	Scrap. Assigns preference rating A-10	M-2	M-5-a	Steel, Nickel Bearing, provides definitions of certain terms (Revoked, now covered by M-21-a)	Steel, Nickel Bearing, supplies M-5. Establishes preference rating and allocation schedules (Revoked, now covered by M-21-a)	PD-10 PD-11 PD-17 PD-18
M-1-c	Scrap and secondary aluminum. Directs distribution. Supplements M-1 and M-1-a.	M-2-a	M-5	Steel, Nickel Bearing, establishes scope of M-5-a (Revoked, now covered by M-21-a)	Steel, Nickel Bearing, establishes scope of M-5-a (Revoked, now covered by M-21-a)	PD-10 PD-11 PD-17 PD-18
MAGNESIUM	To direct distribution Supplements M-2 Extends M-2 to Sept. 1941	M-2 M-2-a Ext.	M-5-a	Steel, Nickel Bearing, establishes scope of M-5-a (Revoked, now covered by M-21-a)	Steel, Nickel Bearing, establishes scope of M-5-a (Revoked, now covered by M-21-a)	PD-10 PD-11 PD-17 PD-18
NICKEL	Directs distribution Nickel bearing steel, directs distribution (Revoked, now covered by M-21 and M-21-a)	M-6 M-5	M-5-a Amend.	Steel, Nickel bearing steel, provides definitions of certain terms (Revoked, now covered by M-21 and M-21-a)	Steel, Nickel bearing steel, supplies M-5. Establishes preference rating and allocation schedules (Revoked, now covered by M-21 and M-21-a)	PD-27 PD-10 PD-11 PD-17 PD-18
CHROMIUM	Directs distribution and conserves supply	PD-53-a PD-53-b PD-54 PD-55	M-14	Nickel bearing steel, provides definitions of certain terms (Revoked, now covered by M-21 and M-21-a)	Ferrotungsten metal powder and tungsten compound, directs distribution	PD-9
M-18	Amends M-18	M-5	M-3	Nickel bearing steel, supplies M-5. Establishes preference rating and allocation schedules (Revoked, now covered by M-21 and M-21-a)	Ferrotungsten metal powder and tungsten compound, revised in form to meet requirements of Federal Register	PD-9
M-18 Amend. GMO No. I Amend.	Stricken from General Metals Order No. I	M-5-a Amend.	M-3-a Rev.	Nickel bearing steel, establishes scope of M-5-a (Revoked, now covered by M-21 and M-21-a)	Tungsten compound and ferrotungsten metal powder, revised in form to meet requirements of Federal Register	PD-9
M-9 M-9 Amend.	Directs distribution Amends preference order M-9, provides information on (1) pool (2) shipments, and (3) toll agreements	M-5-b	M-3-a Rev.	Nickel bearing stainless steel, defines, gives percentage use of primary nickel to total nickel content (Revoked, now covered by M-21 and M-21-a)	Ferrotungsten metal powder and tungsten compound, supplements M-3. Provides preference rating schedule under M-3	PD-9
M-9-a	Supplements M-9, Revokes M-9 Amend.	M-5-a Amend.	M-3-a Rev.	Nickel bearing steel, establishes scope of M-5-a (Revoked, now covered by M-21 and M-21-a)	Tungsten compound and ferrotungsten metal powder, revised in form to meet requirements of Federal Register	PD-9
GMO No. I Amend.	Stricken from General Metals Order No. I	M-5-b	M-3-a Rev.	Nickel bearing stainless steel, defines, gives percentage use of primary nickel to total nickel content (Revoked, now covered by M-21 and M-21-a)	Ferrotungsten metal powder and tungsten compound, extends M-3 and M-3-a to Aug. 31, 1941	PD-9
M-9 Amend.	Alloys and Fabricated Products. Extends preference order M-9 on copper Alloys. Stricken from General Metals Order No. I	M-21	M-23 GMO No. I Amend.	Locomotive repairs, for steam, electrical or diesel locomotives for railroad, mining or industrial use.	Stricken from General Metals Order No. I	PD-9
CRANES	Electric Traveling. Assigns A-1-c rating to material for production	P-8	PD-38 PD-38-a	Freight car construction, including railroad, industrial and mine freight cars. Assigns preference rating A-3	Directs distribution Stricken from General Metals Order No. I	PD-84
P-1	Assigns preference rating A-1-a. Revokes order No. 1	P-20	PD-64-a PD-64-a PD-65-a	Locomotives, specified	Supplements M-11, outlining amounts of metallic zinc, zinc oxide and zinc dust to be set aside each month.	PD-50 PD-50-a PD-62
P-5	Amendment No. 1 to General Preference Order No. P-5, to include hydraulic bridge brakes in exhibit A. Assigns preference rating A-1-a	P-21	PD-64-a PD-64-a PD-65-a	Locomotive repairs, for steam, electrical or diesel locomotives for railroad, mining or industrial use.	Supplements M-11, outlining amounts of metallic zinc, zinc oxide and zinc dust to be set aside each month.	PD-50 PD-50-a PD-62
P-5-a	Cranes and Hoisting Equipment. Material for production.	M-4 M-4-a to M-4-m	Neoprene, directs distribution Neoprene, supplements to M-4	Neoprene, directs distribution Neoprene, supplements to M-4	Directs distribution Supplements M-11, outlining amounts of metallic zinc, zinc oxide and zinc dust to be set aside each month.	PD-7 PD-7
DEFENSE PROJECTS	Material for construction	PD-63	M-13	Rubber, synthetic, directs distribution Rubber, synthetic, directs distribution	Supplements M-11, outlining amounts of metallic zinc, zinc oxide and zinc dust to be set aside each month.	PD-7 PD-7
P-19			M-11-a			

P-19	Material for construction	PD-63	M-15	Directs distribution of rubber and products and materials of which rubber is a compound	PD-49	M-11-b	Supplements M-11 outlining amounts of metallic zinc, zinc oxide and zinc dust to be set aside for August
P-19-a	Material for construction	PD-68				M-11 Amend.	Provides information on: (1) shipments, (2) execution of PD-50 and PD-50-a, (3) toll agreements
P-19-b	Material for construction	PD-68-a					Supplements M-11
FARM MACHINERY		PD-88 PD-81	M-15-a	Supplements M-15, providing percentage of reduction in processing or consumption			
P-32	Material for construction	PD-88					
P-33	Material for construction	PD-81					
FERROALLOYS							
SDO-I	General preference delivery order, covering pig iron, ferroalloys, steel ingots and castings, and all carbon and alloy steel products See SDO-I Amend. under Steel	PD-32 PD-32-a	P-7	Merchant, assigns ratings A-1-a, A-1-b, and A-1-c, in accordance with year of completion	PD-30 PD-30-a	L-4	Alloy steel, See Steel Automobile spare parts. Set quota for production of spare parts for passenger cars and light trucks for period Sept. 15 to Dec. 31, of 60% of parts sold from Jan. 1 to June 30, 1941. Automobile spare parts. Assigns A-10 preference rating to deliveries of materials within the quantities established by limitation order L-4.
SDO-I Amend.			P-14-a	Shipways, which will produce completed ships during 1941. Assigns preference rating A-1-a	PD-56 PD-56-a		Canning Machinery and Equipment, assigns preference rating A-2
GMO No. 1	Metals, restricts inventory accumulation of certain specified materials	PD-19-a PD-19-b	P-14-b	Shipways, which will produce completed ships during 1942 and 1943. Assigns preference rating A-1-b	PD-56 PD-56-a	P-57	Castings, See Steel Defense Supplies Rating Plan, See Supplies Electrical Relays and Solenoid Assemblies, assigns PD-57-a preference rating A-1-c
INVENTORY ACCUMULATION							Freight Cars, See Railroad Equipment Gun Fire Controls, material for production Hoisting Equipment, material for production Locomotives, see Railroad equipment Machinery, textile, grants A-10 rating for maintenance and repair parts Machinery, mining, material for production Neoprene, see also Rubber Pig Iron, see Steel Research, experimental, materials used Radio receiving, transmitting and directional equipment, assigns preference rating A-1-c
GMO No. 1 Amend.	Metals, copper, chromium, copper base alloys, vanadium, and iron and steel products, including rolled, drawn, forging, castings and pig iron, stricken from GMO No. 1	SDO-I	SDO-I Amend.	Alloy Steel Products. Amendment to general steel preference delivery order No. 1 which provides: (1) Submission of PD-32. Revised to Priorities Division by customers if deliveries are deferred or rejected; (2) That PD-32-a Revised, issued on producer's required sworn statement must be returned in five days; (3) Producers issued PD-32-a Revised, required to transmit all records, etc., for inspection by representative of Priorities Division. High speed steel—See Tungsten	PD-32 PD-32-a	P-17	Solenoid assemblies, assigns preference rating A-1-c
GMO No. 1 Amend.	Metals, copper, chromium, copper base alloys, vanadium, and iron and steel products, including rolled, drawn, forging, castings and pig iron, stricken from GMO No. 1 to Oct. 15, 1941					P-15	Supplies, defense supply rating order, assigns preference rating A-10 to certain deliveries
GMO No. 1 Ext. No. 1						P-9-e	Textile machinery, A-10 rating granted for maintenance and repair parts
MACHINE TOOLS, ACCESSORIES AND OTHER METAL WORKING EQUIPMENT						P-5-a	Utilities, grants A-1 preference rating for maintenance and repair materials. Use form entitled "Acceptance of Preference Rating Order No. P-46"
P-2-p	Automatic Screw Machines, assigns preference rating A-1-a	M-24	Iron, Alloy, and Steel, directs distribution. Amended by M-21-A	PD-75	P-24	P-16	PD-57 PD-57-a PD-57-a PD-74-a PD-74-a
P-2-q	Chucks, assigns preference rating A-1-a	GMO No. 1 Amend. SDO-I	Iron and Steel Products, including rolled, drawn, forgings, castings and pig iron, stricken from General Metals Order No. 1	PD-71 PD-32 PD-32-a	P-6	P-15	PD-57 PD-57-a PD-25 PD-25-b PD-25-c PD-25-d PD-88
P-2-n	Chucks, magnetic, assigns preference rating A-1-a	M-17	Pig Iron, directs distribution				
P-2-k	Chucks, pneumatic and hydraulic equipment, assigns preference rating A-1-a	SDO-I	Pig Iron, general preference delivery order, covering pig iron, ferro alloys, steel ingots, and castings, and all carbon and alloy steel products				
P-2-o	Cutoff machinery, assigns preference rating A-1-a						
E-2	Cutting tools, directs distribution						
P-2-i	Cylinders, hydraulic, assigns preference rating A-1-a	SDO-I Amend.					
P-2-d	Die heads, assigns preference rating A-1-a						
P-2-f	Die heads, for tapping shells, assigns preference rating A-1-a						
P-2-q	Drill braces, assigns preference rating						

of supplying the Priorities
Division with a copy of a
sworn statement (PD-19-a)
Metals, extends GMO No.
1 to Oct. 15, 1941

GMO
No. 1
Ext.
No. 1

MACHINE TOOLS, ACCESSORIES AND OTHER METAL WORKING EQUIPMENT

P-2-p	Automatic Screw Machines, assigns preference rating A-1-a	M-24	Iron, Alloy, and Steel, directs distribution. Amended by M-21-A.	PD-75	P-24	for production
P-2-a	Chucks, assigns preference rating A-1-a	GMO No. 1 Amend.	Iron and Steel Products, including rolled, drawn, forgings, castings and pig iron, stricken from General Metals Order No. 1	PD-71 PD-32 PD-32-a	P-16	Hoisting Equipment, material for production
P-2-n	Chucks, magnetic, assigns preference rating A-1-a	M-17 SDO-I	Pig Iron, directs distribution Pig Iron, general preference delivery order, covering pig iron, ferro alloy, steel ingots, and castings, and all carbon and alloy steel products	PD-71 PD-32 PD-32-a	P-15	Locomotives, see Railroad equipment
P-2-k	Chucks, pneumatic and hydraulic equipment, assigns preference rating A-1-a	SDO-I Amend.	Pig iron, amend to general steel preference delivery order No. 1 which provides: (1) Submission of PD-32 Revised to Priorities Division by customers if deliveries are deferred or rejected; (2) That PD-32-a Revised, issued on producer's required sworn statement must be returned in five days; (3) Producers issued PD-32-a Revised, required to transmit all records, etc.	PD-46	P-6	Machinery, textile, grants A-10 rating for maintenance and repair parts
P-2-o	Cutoff machinery, assigns preference rating A-1-a	E-2	Cutting tools, directs distribution Cylinders, hydraulic, assigns preference rating A-1-a	P-53	M-21-b	Machinery, mining, material for production
P-2-l	Cutting tools, directs distribution Cylinders, hydraulic, assigns preference rating A-1-a	P-2-d	Die heads, assigns preference rating A-1-a	PD-46	PD-46	Neoprene, see also Rubber
P-2-q	Drill braces, assigns preference rating A-1-a	P-2-f	Die heads, for tapping shells, assigns preference rating A-1-a	PD-46	PD-46	Pig Iron, see Steel
P-2-i	Gages, assigns preference rating A-1-a	P-2-n	Drill heads, assigns preference rating A-1-a	PD-46	PD-46	Research, experimental, materials used
P-2-h	Grinding machines, assigns preference rating A-1-a	P-2-h	Die heads, for tapping shells, assigns preference rating A-1-a	PD-46	PD-46	Radio receiving, transmitting and directional equipment, assigns preference rating A-1-c
P-5	Foreign government preference rating certificate.	PD-3	Grinding machines, assigns preference rating A-1-a	PD-46	PD-46	Solenoid assemblies, assigns preference rating A-1-c
PD-6	Tabulation of extension for preference ratings made pursuant to general preference order P-2 and P-5.	PD-4	Lathes, turret, assigns preference rating A-1-a	PD-46	PD-46	Supplies, defense supply rating order, assigns preference rating A-10 to certain deliveries
PD-7	Monthly Neoprene requirements.	PD-5	Foreign government preference rating certificate.	PD-46	PD-46	Textile machinery, A-10 rating granted for maintenance and repair parts
PD-8	Priority rating index of products requiring aluminum.	PD-2	Tabulation of extension for preference ratings made pursuant to general preference order P-2 and P-5.	PD-46	PD-46	Utilities, grants A-1 preference rating for maintenance and repair materials. Use form entitled "Acceptance of Preference Rating Order No. P-46"
PD-9	Request for ferrotungsten and tungsten metal powder or tungsten compounds.	PD-3	U. S. Army or Navy preference rating certificate.	PD-46	PD-46	Warehouses, assigns preference rating of A-9 to deliveries within quotas; describes method of establishing quotas
PD-10	Requests for nickel bearing steel.	PD-4	U. S. Government agency preference rating certificate, other than Army and Navy.	PD-46	PD-46	Wrought iron, distribution controls. See also M-21-a

Forms Called For By Priority Orders

FORM NUMBER	DESCRIPTION	FORM NUMBER	DESCRIPTION
PD-1	Application for preference rating.	PD-32-a	Priority Division order on producer of items under PD-32 for which delivery has been refused.
PD-1-a	Supplier's statement relating to application for preference rating. (Note: This form has been discontinued.)	PD-33	Report of producer's stock and production, and orders, covering Preference Order to direct the distribution of synthetic Rubber.
PD-2	Civilian preference rating certificate.	PD-34	Producer's affidavit concerning customer's requirements for delivery. (Not issued.)
PD-3	U. S. Army or Navy preference rating certificate.	PD-35	Producer's affidavit concerning refusal to accept customer's order.
PD-4	U. S. Government agency preference rating certificate, other than Army and Navy.	PD-36	User's consumption allotment, receipts, and requirements, covering Preference Order to direct distribution of synthetic rubber.
PD-5	Foreign government preference rating certificate.	PD-37	Reports of production of duty-free refined copper; April, 1941.
PD-6	Tabulation of extension for preference ratings made pursuant to general preference order P-2 and P-5.	PD-38	Tabulation of preference rated orders placed during a given month covering material and equipment entering into Freight Car Construction including rail-
PD-7	Monthly Neoprene requirements.	PD-39	Inventory of nickel bearing steel.
PD-8	Priority rating index of products requiring aluminum.	PD-40	Report of inventory of nickel bearing steel.
PD-9	Request for ferrotungsten and tungsten metal powder or tungsten compounds.	PD-41	Freight Car Construction including rail-
PD-10	Requests for nickel bearing steel.	PD-42	Freight Car Construction including rail-
PD-11	Report of inventory of nickel bearing steel.	PD-43	Freight Car Construction including rail-

PD-10	Requests for nickel bearing steel.	Tabulation of preference rated orders placed during a given month covering material for aircraft frames.	PD-38-a	Tabulation of extensions of preference placed pursuant to General Preference Order No. P-11.	PD-58	Tabulation of extensions of preference made pursuant to Preference Order P-16.
PD-11	Report of inventory of nickel bearing steel.	Tabulation of preference rated orders placed during a given month for material for airplane engines and propellers.	PD-39	Alternate form to PD-38.	PD-59	Certification relating to tabulations of preference rating order placed during a given month; placed pursuant to Preference Order P-16.
PD-13	Tabulation substantiating evidence of monthly aluminum delivery schedule.	Inventory and consumption of aluminum. Report to be filed by companies requesting aluminum for delivery after July 7.	PD-40	Analysis and inventory of duty-free copper for domestic consumption. (Oct. to June, 1941.)	PD-60	Requirements of duty-free copper.
PD-14	Freight Car Construction including railroad, industrial and mine freight cars.	Tabulation of extensions of preference ratings made pursuant to General Preference Order No. P-11.	PD-42	Analysis and inventory of duty-free copper for domestic consumption. (April to June, 1941.)	PD-61	Production and shipments of duty-free copper.
PD-17	Receipts and shipments of nickel bearing steel for a given month. (Report of distributor.)	Tabulation of extensions of preference ratings made pursuant to General Preference Order No. P-11.	PD-42-a	Tabulation of extensions of preference ratings made pursuant to General Preference Order No. P-11.	PD-62	Applications for allocation of zinc oxide for a given month.
PD-18	Customer's sworn statement. (To be filed with suppliers concerning General Metals Order No. 1.)	Tabulation of extensions of preference ratings made pursuant to General Preference Order No. P-9-a.	PD-43	Report of contracts or orders to which the preference rating assigned by Preference Order P-19 has been applied during a month.	PD-63	Report of contracts or orders to which the preference rating assigned by Preference Order P-19 has been applied during a month.
PD-19-a	Supplier's statement of compliance with General Metals Order No. 1. (Printed on reverse side of PD-19-a.)	Certification relating to tabulation of preference rating order placed during a given month; placed pursuant to Preference Rating Order No. P-9-a.	PD-43-a	Certification relating to tabulation of preference rating order placed during a given month; placed pursuant to Preference Rating Order No. P-9-a.	PD-64	Reports of contracts or orders to which the preference rating assigned by Order P-20 has been applied during a month.
PD-19-b	Application for priority allocation of a defense material in General Metals Order No. 1.	Tabulation of extensions of preference ratings made pursuant to General Preference Order No. P-9-b.	PD-44	Certification relating to tabulation of preference rating order placed during a given month; placed pursuant to Preference Order No. P-9-b.	PD-65	Certification to accompany purchase orders furnished by the builder or supplier.
PD-20	Nickel steel and nickel content thereof required by automobile manufacturers as of April 30, 1941. (Form is obsolete.)	Certification relating to tabulation of preference rating order placed during a given month; placed pursuant to Preference Order No. P-9-b.	PD-44-a	Certification relating to tabulation of preference rating order placed during a given month; placed pursuant to Preference Order No. P-9-b.	PD-66	Requirements of Lead.
PD-21	Consumption of scarce metals per 1000 vehicles. (Form is obsolete.)	Tabulation of extensions of preference ratings made pursuant to General Preference Order No. P-9-c.	PD-45	Report of contracts or orders to which the preference rating assigned by Preference Order P-21 has been applied during a month.	PD-68	Report of contracts or orders to which the preference rating assigned by Order P-20 has been applied during a month.
PD-22	Report to be filed by all customers requesting delivery of aluminum after a given date. (Form has been withheld.)	Certification relating to tabulation of preference rating order placed during a given month; placed pursuant to Preference Order No. P-9-c.	PD-45-a	Certification relating to tabulation of preference rating order placed during a given month; placed pursuant to Preference Order No. P-9-c.	PD-69	Certification to accompany purchase orders furnished by the builder or supplier.
PD-23	Priorities Critical List.	Tabulation of extensions of preference ratings made pursuant to General Preference Order No. P-9-d.	PD-46	Tabulation of extensions of preference ratings made pursuant to General Preference Order No. P-9-d.	PD-70	Customer's report of inventory and consumption of pig iron.
PD-24	Report of requirements for scarce materials for a given quarter.	Certification relating to tabulation of preference rating order placed during a given month; placed pursuant to Preference Order No. P-9-d.	PD-46-a	Certification to accompany purchase order furnished by the repairer or builder.	PD-71	Producer's shipping schedule.
PD-25	Report of requirements for scarce materials for a given quarter. (Not issued.)	Tabulation of extensions of preference ratings made pursuant to General Preference Order No. P-9-e.	PD-47	Tabulation of extensions of preference ratings made pursuant to General Preference Order No. P-9-e.	PD-72	Requirements of calcium silicon for a month.
PD-25-b	Report of extension of defense supply rating order.	Certification relating to tabulation of preference rating order placed during a given month; placed pursuant to Preference Order No. P-9-e.	PD-47-a	Certification relating to tabulation of preference rating order placed during a given month; placed pursuant to Preference Order No. P-9-f.	PD-73	Customer's statement to producer classifying purchase order or contract for steel.
PD-25-c	Customer's certificate of defense requirements in conjunction with Defense Revised Supplies Rating Order.	Tabulation of extensions of preference ratings made pursuant to General Preference Order No. P-9-f.	PD-48	Tabulation of extensions of preference ratings made pursuant to General Preference Order No. P-9-f.	PD-76	Copper allocation certificate.
PD-25-d	Aluminum monthly shipping schedule.	Schedule I. Detailed application for nickel required for melting in a given month.	PD-48-a	Certification relating to tabulation of preference rating order placed during a given month; placed pursuant to Preference Order No. P-9-f.	PD-83-a	Steel warehouse statement of deliveries for first quarter of 1941.
PD-26	Detailed application for nickel required for melting in a given month.	Schedule 2. Summary of detailed application for nickel for a given month and statement of stocks.	PD-49	Customer's Affidavit.	PD-88	Application for preference rating orders.
PD-27	Customer's statement of failure to obtain required delivery or place order for pig iron, ferrous alloys, steel ingots, and castings, or carbon and alloy steel, in connection with General Steel Preference Order.	Tabulation of Extensions of preference ratings made pursuant to Preference Order P-13.				
PD-30	Tabulation of preference rated orders placed for a given month, covering material and equipment entering into merchant ship construction.					
PD-32	Customer's statement of failure to obtain required delivery or place order for pig iron, ferrous alloys, steel ingots, and castings, or carbon and alloy steel, in connection with General Steel Preference Order.					
PD-30-a	Alternate form to PD-30.					
PD-32-a						

THE IRON AGE

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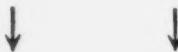
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NEWS OF INDUSTRY

here, we will be happy. We keep close track of subcontractors' production. When they reach 24 hours per day production, we begin looking around for more subs for the same part."

Only a few hours before the clinic opened, the War Department announced that 9974 subcontractors had received work on its ordnance department orders. Fifty of its prime contracts totaling \$271,651,962 were subcontracted to the amount of \$163,538,719. The highest percentage of subcontracting occurred among those companies making tank and combat vehicles.

Meanwhile, in Chicago last Monday William S. Knudsen, director general of OPM, asserted in a speech before the Union League Club that, "the services have placed over 20,000 supply contracts of \$10,000 or more with a total value of over 14 billion dollars. New plants and additions to plants number 2750 with a value of 4.8 billions, of which 3.8 billions is government financed. There are still a number of plants projected with government funds, these being principally explosives and ammunition plants, for which there are no private facilities available."

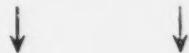


Scarcities Threaten Alabama Industries Birmingham

• • • Scarcity of raw materials and priorities are seriously threatening continued production by many smaller Alabama industries and jeopardizing a \$15,150,000 annual payroll paid to more than

14,500 workers, it was indicated at a meeting held here last week by the defense advisory committee of the Alabama State Chamber of Commerce.

In an effort to find a remedy, the State Chamber announced its representatives will visit every manufacturer of the state to get a first hand picture of conditions and then will seek a program to relieve the emergency in cooperation with L. E. Geohegan, manager of the defense contract service at Birmingham.



2 Mother Hens for 46 Peoria Plants

Chicago

• • • Three Illinois cities—Peoria, Decatur and Bloomington—are in the vanguard of communities pooling manufacturing facilities in a last ditch fight against unemployment due to priorities.

Peoria is further along than any city in the state, probably than any in the mid-west. With two large, complete plants acting as "Mother Hens," 46 plants have joined a "Group Resources" pool which started functioning the first of this month. Already, THE IRON AGE has learned, the pool has submitted bids on eight prime contracts, as yet had no definite orders, when this was written.

The two "Mother Hen" plants, who have so far refused to permit the use of their names in print, accept financial, performance and delivery responsibility for any defense contracts obtained by the group. Plan functions through an Engineering Committee drawn from member plants. Committee

meets every noon in the office of the Association of Commerce, inspects part drawings sent it by an arrangement with Chicago office of OPM, then determines on what contracts its group can submit bids. Member firms consult with their Engineering Committee and they may find themselves bidding against each other if the committee finds that more than one plant has capabilities for a certain contract.

The Committee also visits the defense part display of the Chicago Ordnance District and the Rock Island arsenal to see at first hand what parts can be fitted into the Peoria pool. With complete surveys of plant facilities, plus first-hand acquaintance with local shops, the fact that eight bids were submitted in the first two weeks of the plan's operation, shows practical benefit of the method.

About 15 Decatur plants are in the process of getting their pool to the point of submitting bids. This group has employed a sales engineer to sell its facilities to defense. Started about the same time as the Peoria plan, Decatur firms have compiled their facilities surveys and are letting the sales engineer acquaint himself with local equipment before going out after contracts. Method of using one man's time exclusively to promote such a manufacturing pool is recommended as a practical approach to the problem.

Bloomington, too, has not yet reached the point where it can submit bids, expects to do so by the end of this month. About 10 firms are in the pool there and they will have completed their surveys by the time this appears.

Important defense primary contractors have repeatedly said that the system of grouping firms into one pool is the most practical method of securing sub-contracts and prime contracts in most communities. Too many smaller firms do not have the equipment to handle a complete job in their own plant. Illinois state government is now behind the pooling movement, the labor department actively assisting localities in getting their surveys in order. OPM has promised special attention to these pools which seemingly are the answer to spreading defense work and preventing shutdowns and unemployment because of critical material shortages.

ADMISSION CARD	
NATIONAL DEFENSE PRODUCTION CLINIC	
Admit the following:	Grand Central Palace, N.Y.C.
C. J. Rhodes	OPM
MONDAY	Your facility card was analyzed and you are advised to contact the following firms:
SEPT. 22	Brewster Aeronautical Co. Savage Arms Corp. United Aircraft Corp. Westinghouse Elec. & Mfg. Co. Wright Aeronautical Co. General Elec. Co. Bendix Aviation Corp. General Motors (Rochester Rd.) Hyatt Bearings Div. Smith & Wesson

TIMESAVER: Subcontractors were mailed this helpful card suggesting firms to contact at the clinic. In many cases the method proved helpful in others it was useless.

Use of Form PD-73 Simplified by OPM

Washington

• • • An amendment, effective immediately, making procedural changes in General Preference Order M-21, designed to make less burdensome the filling of forms by producers and purchases of steel has been issued by OPM. Highlights of the changes are as follows:

On all export sales as defined in group E of Form PD-73, Form PD-73 shall be filed not only with the producer but also with the Iron and Steel Branch, OPM.

On all export sales as defined in group E of Form PD-73 (except

sales to purchasers in Canada) where orders are placed prior to Dec. 1, 1941, Form PD-73 may be filed by the accredited agent or export division of the producer in the United States.

When steel is shipped by a producer direct to the customer of a warehouse, Form PD-73 is to be filed with the producer by the customer and not by the warehouse.

When the purchaser is the War Department or Navy Department, or a warehouse, the purchaser may report on a single Form PD-73 all orders in a single group classification placed during a single month. In such case each Form PD-73 must be filed with the producer on or before the fifth day of the following month.

H. C. Murrer Heads Tool Makers Group

Cincinnati

• • • H. C. Murrer of the Modern Tool Co., Cincinnati, has been elected president of the Tool Manufacturers' Association of Southern Ohio at a meeting recently. Other officers are: E. H. Johnson, of the Johnson Tool & Engineering Co., vice-president; George J. Capliski of the Eureka Tool & Die Co., treasurer; J. J. Kohl, of the International Tool Co., and W. M. Habem of the Norwood Engineering Co., trustees. The tool manufacturers' association was organized in May, 1928, and has been in operation since that time.

OPM Answers Questions of Steel Users on Filing of Form PD-73

• • • Questions most frequently asked concerning Form PD-73 and the steel priority order M-21, and the answers provided by OPM are listed below.

When shall I file PD-73 for orders placed AFTER Sept. 1?

On all orders placed after Sept. 1, Form PD-73 shall be filed with the producer when the order is placed.

What about orders placed BEFORE Sept. 1?

On all orders placed prior to Sept. 1, with deliveries to be made after Sept. 1, Form PD-73 shall be filed with the producer on or before Oct. 15. (However, we [The OPM] are earnestly requesting that every purchaser of steel file with his producer, as soon as possible, PD-73 to cover all orders placed prior to Sept. 1. We are asking for all customers' cooperation in this matter, because we are demanding that the steel producers give us a report covering their September shipments on the basis of the group classifications, and it will be necessary for the producers to have the proper classifications on orders placed prior to Sept. 1, if they are to give us a true picture of their shipments for the month of September.)

Who files on shipments direct to a customer of a warehouse?

Where steel is shipped by a producer direct to a customer of a warehouse or jobber, Form PD-73 is to be filed with the producer by the customer, not by the warehouse or jobber.

How many orders will one Form PD-73 cover?

A customer may file one Form PD-73 to cover more than one order placed on the same date with a producer if all material is for the same group classification.

How many forms does a warehouse file?

A warehouse may file with a producer a single Form PD-73 covering all orders in a single group classification placed with such producer during any calendar month. Each such Form PD-73 must be filed with the producer on or before the fifth day of the following month. A similar procedure may be followed when the purchaser is the United States Army or Navy.

Who files on export orders?

On export orders (except Canadian) now on the books of a producer or placed prior to Dec. 1, 1941, Form PD-73 may be filed by the accredited agent or export division of the producer in the United States. On orders placed on or after Dec. 1, Form PD-73 must be filed by the purchaser with his order.

Do I file if I buy seconds?

All purchases of steel, seconds as well as primes, are to be reported on Form PD-73.

How long do I have to keep my records?

Records must be preserved for at least two years by all persons affected by the order. This includes purchasers as well as producers.

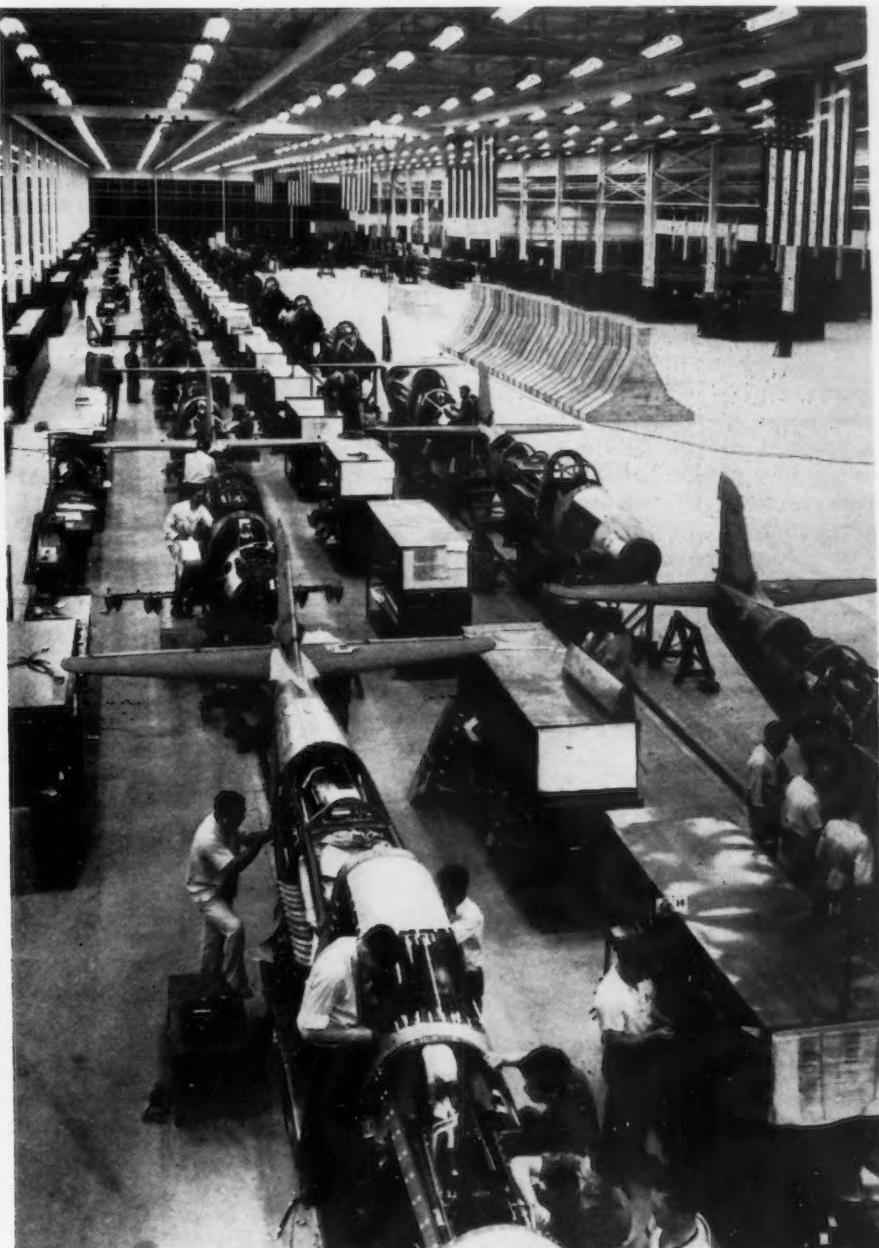
Where do I list products whose ultimate use is not clearly defined?

Producers of steel who cannot clearly identify the ultimate use of the material under groups A to G, inclusive, will class these orders under Group H. For example, a person who buys steel to produce "off the shelf" products and cannot determine the ultimate destination of these finished products, and also is not covered by the Defense Supplies Rating Plan, or other orders issued by the Director of Priorities must classify his purchases under "H." A statement from a purchaser of steel that a large percentage of his finished products are used in defense, or that they expect to obtain a preference rating in the near future, cannot be used to classify the customers' orders on Forms PD-73. Such orders would be classified in "H."

NEWS OF INDUSTRY

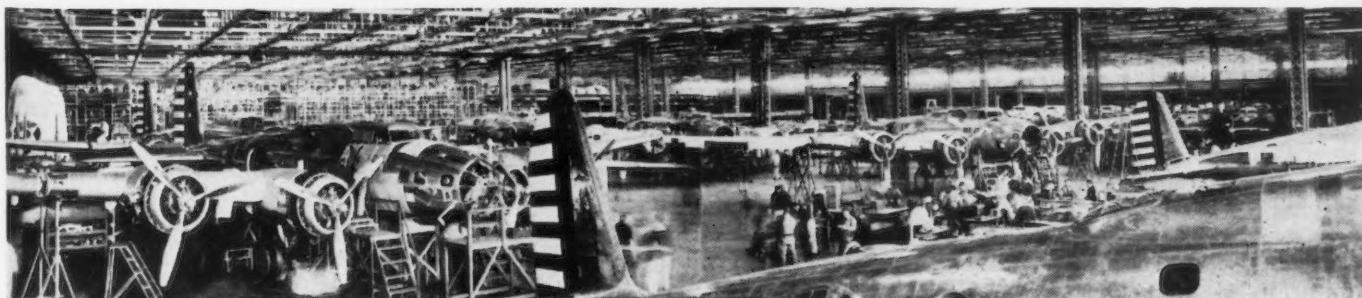


NEW LABOR BOARD MEMBER:
Gerard D. Reilly, 34, has been appointed by President Roosevelt to be the third member of the National Labor Relations Board. Reilly, a native of Boston, has been solicitor of the Labor Department since August, 1937.



SECOND AIRCOBRA LINE: The second power-driven assembly line (above) of Bell Aircobras recently was placed into operation at the Niagara Falls, N. Y., plant of Bell Aircraft Corp. Provision is made for opening up four more such lines in this plant. Bell recently received a \$75 million contract from the War Department.

THE AIRCRAFT INDUSTRY GROWS: This view across the smaller of two wide span final assembly bays at the Boeing Aircraft Co.'s No. 2 plant in Seattle, Wash., is more evidence of how the U. S. aircraft industry has grown. The picture taken from just inside the 195-ft. canopy hangar door before a new 300 x 500-ft. assembly bay had been occupied, shows an accumulation of fuselages awaiting final assembly in the right background.



Iron Ore Use Sets New High in August

Cleveland

• • • United States blast furnace consumption of iron ore in August reached a new record of 6,393,215 gross tons, the Lake Superior Iron Ore Association reports. This brought total 1941 use through September 1 to the unprecedented high of 48,681,413 gross tons, excluding 1,031,536 gross tons consumed in Canada.

Moreover, the busy Lake ore fleet has permitted the building up of winter ore reserves to 31,330,782 gross tons at United States furnaces, with an additional 4,011,601 gross tons on Lake Erie American docks. A month ago the reserve at United States furnaces was only 27,333,285 gross tons, while 3,340,517 gross tons were on Lake Erie docks.

Canadian consumption of Lake Superior iron ore in August amounted to 141,209 gross tons, and six of the seven blast furnaces in the Dominion were operating on September 1.

Canada to Build New Type Warship on West Coast

Ottawa

• • • Navy Minister Macdonald disclosed recently that a new type of warship, only slightly smaller than a destroyer, will be under construction soon in Canadian West Coast shipyards. This new ship is somewhat larger than the corvette, and construction of a large number is contemplated. They are too large to pass through the locks on the St. Lawrence River, so they will not be built in the Upper Lakes yards, but will be confined to yards on the Lower St. Lawrence, the Maritimes and Pacific coast.

2200 SWOC Sitdowners Ejected at Chicago Plants

Chicago

• • • Approximately 2200 "sit-down" strikers had to be ejected by police from two plants of the American Can Co. here. Ejection took place after three days of inactivity. Most of the sitdowners were members of the SWOC, seeking to negotiate for higher wages and a closed shop.

THIS WEEK'S

Priorities and Prices

Foundry and by-product furnace coke prices frozen at current levels in price schedule No. 29 issued Sept. 19. Order becomes effective Oct. 1. (OPA-PM1191)

Pig tin assaying 99.80 per cent pure, but containing impurities exceeding tolerances permitted for Grade A metal, classified as Grade B tin in amendment to schedule No. 17. (OPA-PM1200)

Copper scrap contracts entered into prior to Aug. 19 calling for delivery at prices in excess of the ceilings may now be shipped without formal approval from Washington. (OPA-PM1186)

Repair and replacement parts for passenger cars and light trucks assigned preference rating of A-10 on specified items; quotas announced for volume of such parts which can be manufactured. (OPM-PM1199)

Coal mining companies granted preference rating of A-1-a for materials for emergency repairs, and A-8 for operating supplies. (OPM-1178)

Defense housing units which are privately financed granted priority assistance to facilitate construction; project preference ratings to be issued upon request. (OPM-PM1192)

Anthracite coal prices will not be advanced beyond the Sept. 15 level without consultation with defense authorities, it was decided at meeting of producers and OPA officials. Price schedule No. 27, covering anthracite, has been revoked. (OPA-PM1183)

Classification of steel products by several national associations, which will reduce the number of types and shapes produced, is expected to increase production. (OPM-PM1193)

Textile machinery repair and maintenance parts assigned preference rating of A-10 to assure continued operations in textile industry. (OPM-PM1166)

Steel priority order, M-21 amended to simplify filing of forms by producers and purchasers. (OPM-PM1168)

Alloy iron and steel and wrought iron subjected to additional regulations by Supplementary Order No. M-21-a. Deliveries under toll agreements permitted only under expressed authority of defense officials. (OPM-PM1169)

Scrap steel price schedule amended to establish parity for all consumers in the Cincinnati area and to provide an incentive for selling scrap rails and rerolling rails. (OPA-PM1216)

Public utilities granted preference rating of A-10 for maintenance and repair materials and operating supplies. (OPM-PM1176)

Oil line priorities denied for line from New York to Texas due to fact that project would require large quantities of steel plates.

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For copies of above announcements address defense agency concerned, at Washington, giving announcement number as shown in brackets after each paragraph (OPM-PM1032 means announcement 1032 issued by Office of Production Management.)

Weatherhead, Holley Sign Defense Plant Corp. Leases

Washington

• • • The Defense Plant Corp. has made reimbursement lease agreements for the War Department with the Weatherhead Co., Cleveland manufacturer of aircraft fittings, for non-mechanical building installations, machinery and equipment valued at \$1,018,200 for the company's existing plant; and with the Holley Carburetor Co., Detroit.

CIO Asks Freedom For Harvester Rioters

Richmond, Ind.

• • • State CIO officials demanded "unconditional freedom" of 37 Richmond unionists slated for trial on charges of inciting riots at the strike-bound International Harvester plant, here, last March. Demand for freedom of their members was made in a resolution adopted at a union meeting here on "civil liberties."

OPM Seeks Cut in Grades of Steel

Washington

• • • Reduction of steel specifications, compositions, sizes and shapes, particularly with respect to alloy steels, as a means of increasing production from existing facilities is contemplated in a program instituted by the OPM. At its request and under its supervision, the American Society for Testing Materials, the Society of Automotive Engineers and the American Iron and Steel Institute will carry out the project with the collaboration of the War and Navy Departments.

Directing the work will be an administrative committee selected from these five groups with advisors from other interested organizations. C. L. Warwick, OPM consultant and secretary-treasurer of the A.S.T.M. is Chairman of the committee.

At its first meeting on Sept. 12 the committee outlined as its objective the establishment as promptly as possible of a selected list of steel specifications. This list is to be designated as the National Emergency Steel Specifications, which in effect, it was stated, involves the selection of

the minimum number of steel specifications, compositions and sections necessary to meet direct and indirect defense requirements.

"It is believed that the productive capacity of the steel industry, and of the manufacturing industries using steel for defense equipment, can be materially increased within present facilities by concentration of production upon a reduced number of steels, particularly with respect to alloy steels," said a statement by the OPM Division of Purchases. "Consideration will necessarily be given to non-defense requirements for steel in establishing the List of National Emergency Steel Specifications."

OPM said it is its intention to have its Iron and Steel Section use the list as an aid in administering steel priorities and allocations.

A classification of steel products has been made, it was announced, and committees of technical representatives of both users and producers of steel are being organized to handle the work. The committee on carbon and alloy steel plates, and on aeronautic steels will be the first to get under way.

Henderson Appoints OPA Division Heads

Washington

• • • Leon Henderson, price administrator, has appointed the following as heads of various OPA divisions:

Iron and steel section—Herbert Ziegler, former district manager, Reliance Steel Corp.; and Frank Beane, of Fenner & Beane, New York brokerage firm.

Non-ferrous metals section—James Bruce, formerly manager of Cyprus Mines Corp., Island of Cyprus, Los Angeles, Calif.

Industrial and agricultural machinery section—Edward John Ure, former industrial engineer with Continental Oil Co., Ponca City, Okla.

Automobiles and truck section—Ervin G. Stier, formerly cost accountant, the International Harvester Co., Fort Wayne, Ind.

Consumers durable goods section—Arthur Oppenheimer, Jr., formerly with Bloomingdale's, New York City.

Lack of Scrap Steel Hits Army Cot Making

Buffalo

• • • How the scrap shortage may eventually affect Army men is seen in the series of repercussions resulting from closing of the Buffalo Steel Co. plant here because of lack of scrap. E. J. Barcalo, president of the Barcalo Manufacturing Co. here, told Representative Alfred F. Beiter of the 41st district that unless he obtains angles soon, an order for 150,000 cots for the Army might not be completed on time. The Buffalo Steel Co. for 30 years has supplied stiff angles to the cot firm.



Photo by Wide World
NEW ALLIS GUN: The first 90 mm. anti-aircraft gun mount to be produced by private industry in the U. S. was completed recently by the Allis-Chalmers Mfg. Corp. Inspecting the gun, at the left above are (l. to r.) Lieut. Gov. Charles Dawson, of Indiana, Max W. Babb, president of Allis-Chalmers, and Col. Donald Armstrong, executive officer of the Chicago Ordnance District.

Henderson "Best" for Price Job—Baruch

Washington

• • • Bernard M. Baruch, World War head of the War Industries Board, told the House Banking and Currency Committee last week that the Administration's pending price control bill in its present form will put Price Administrator Leon Henderson on the spot because "when he is slapping down on one price increase 100 more will be springing up behind his back."

Mr. Baruch, who promised three weeks ago to "knock the everlasting life" from the bill when he appeared before the committee, declared that price legislation to be effective should put a blanket ceiling on the national price structure, and include wages, rents and commodity prices. He characterized the pending bill as only a medium for imposing piecemeal price-fixing.

He described Mr. Henderson as the best man to do the price stabilizing job, recommended a price ceiling at levels which prevailed early in 1941, and asserted that

effective price control meant the transformation of the normal competitive economy to a practically single unitary system, under which all producers would co-operate, sharing trade secrets, pooling patents, resources and facilities.

While commending the appointment of Floyd Odlum as head of a new OPM division of contract distribution, and conceding that SPAB is doing a good over-all job, Mr. Baruch referred to what he called two chief faults in the present defense set-up. The program, he said, has not yet attained the full mobilization of our industrial power. Second, he insisted that the required organizational set-up has not yet been completed.

Order for 14 Vessels Goes To Gulf Shipbuilding

• • • The Maritime Commission last week awarded a contract to the Gulf Shipbuilding Corp., Mobile, Ala., for construction of 14 emergency cargo ships of the modified C-2 design. To cost \$2,520,000 each, the ships will require a total of about 50,000 tons of steel.

LOADING A WELLINGTON: Workers at an RAF bomber station are loading 250-lb. bombs into a Wellington in preparation for a flight over German-occupied France.

Photo by Harris-Ewing



Shortages End 3000 Jobs At Evansville

Evansville, Ind.

• • • Almost one-fourth of the 12,000 industrial working population here is out of work because of material shortage plant shutdowns. The branch auto factories here of Briggs and Chrysler, which together employ 3000 have released about 1200 workmen, and are operating at 55 per cent of capacity. Servel, maker of refrigerators, has laid off 1600 from a normal payroll of 3600. Sunbeam Electric Mfg. Co., producer of refrigerators, may cut its 3000 force by one-third by the end of this month. Electrical industry here employs about 7000. Automotive manufacturing employs 8000 and miscellaneous industry 2000.

"Faked" Ratings Found On Some PD-73 Forms

Chicago

• • • Steel consumers' submitting of PD-73 forms is bringing both happy and sorrowful results to mills here. On the credit side, one executive told THE IRON AGE that compulsory filing of the forms is bringing out voluntary delivery adjustments which, if continued, might bring the industry out of its "squeeze" as early as the first of December. This official stated that many firms originally scheduled to receive shipments in September and October have admitted that they will not need steel until December and January. Even some railroad car builders are found in this class.

On the other hand, many mills have been forced to return to customers a number of the forms because they were incorrectly submitted. Failure to specify priority rating on orders, necessitating return of form and subsequent delay, is a common event. There have also been frequent cases of "faking" ratings—so flagrant that they could be easily detected by mills. These are generally queried by the producer, often arousing ire of the consumer as a result. But, generally, mills feel the form is clearing up books, ridding them of a lot of deadwood.

NEWS OF INDUSTRY

DMB Holds Wagner Act Upholds Union Maintenance Ruling

Washington

• • • President Roosevelt received assurances from the National Defense Mediation Board last week that the "maintenance of membership" clause, recommended by the board in the case involving the Federal Shipbuilding & Dry Dock Co., does not conflict with the Wagner Act. At the same time the United Mine Workers agreed with the mediation board to resume work in steel-owned and other captive coal mines for a 30-day period, pending the outcome of further negotiations.

Mr. Roosevelt took a hand in the Federal Shipbuilding case by writing to National Defense Mediation Board Chairman William H. Davis, observing that information supplied to the White House indicated that unless the "maintenance of membership" obligation is deemed a provision of the closed shop, it would violate Subdivision (3) of Section 8, of the Wagner Act.

In reply, Mr. Davis quoted the clause recommended by his board, referred to the section of the Wagner Act mentioned by Mr. Roosevelt, consulted the general counsel of the NLRB, and concluded that the language in the Wagner Act constitutes "an express statutory sanction of the maintenance of membership clause" recommended by the defense mediation board.

The recommended clause constitutes an engagement by the shipbuilding company that "any employee who is now a member of the union, or who hereafter voluntarily becomes a member during the life of this agreement, shall, as a condition of continued employment, maintain membership in the union in good standing."

The provision in the Wagner Act cited by Mr. Roosevelt provides that "nothing in this act shall preclude an employer from making an agreement with a labor organization to require as a condition of employment membership therein, if such labor organization is the representative of the employees as provided in Section 9 (A), in the appropriate collective

bargaining unit covered by such agreement when made."

The temporary settlement formula in the captive coal mine dispute was announced by Chairman Davis in the presence of coal operators, steel industry representatives and key members of the CIO's United Mine Workers Union. John L. Lewis, union president, said that the union's agreement to order the miners back to work while the mediation board considers the merits of the case was prompted by "a desire to make a contribution to the national interest."

At the same time the former CIO generalissimo insisted that his union still dissents from the principle that "strikes must be broken as the quid pro quo for consideration of a case on its merits" before the NDMB or other government agency.

Under the terms of the agreement announced by Chairman Davis, the mediation board retains jurisdiction of the controversy during the 30-day period and will continue with the parties collective bargaining negotiations in an endeavor to arrive at a mutually satisfactory agreement.

OPM Defines Term "Steel and Iron Alloys"

Washington

• • • A supplemental order issued last week by OPM includes a definition of alloy steel and alloy iron and wrought iron and specifically authorizes the director of priorities to issue directions to any producer as to deliveries he may make or the kinds of alloys he may produce.

The OPM defined as an alloy and iron or steel containing one or more of the following elements: "Manganese in excess of 1.65 per cent; silicon in excess of 0.60 per cent; copper in excess of 0.60 per cent; aluminum, chromium, cobalt, columbium, molybdenum, nickel, titanium, tungsten, vanadium, zirconium or any other alloying element in any amount specified or known to have been added to obtain a desired alloying effect."

The order stipulates that deliveries under toll agreements must be specifically authorized by the director of priorities. The new order is identified as Supplementary Order M-21-A. The M-21 order previously issued provides

full priority control over steel products.

The supplemental order also revokes general preference order M-5, supplemental order M-5-a and supplemental order M-5-b, all relating to nickelbearing steel, which is now included under orders M-21 and M-21-a.

A-10 Rating for Utilities Will Enable Needed Supplies

Washington

• • • OPM Director Donald M. Nelson last week issued an order permitting five groups of public utilities and their suppliers to use an A-10 rating to facilitate deliveries of maintenance and repair materials and operating supplies which are vitally needed for defense and essential public services. The utilities covered are electric, gas, water, sanitation services and central steam heating.

The A-10 rating can be used by the utility or by the supplier (subject, of course, to the limitations of the order) to obtain maintenance material, needed for the upkeep of property and equipment in sound condition; repair material, needed for restoration of property and equipment to sound condition after wear and tear, damage, destruction or the like; and operating supplies, material essential to the operation of the utility involved and which is generally carried in the company's stores and charged to operating expenses.

64 Small Shops Listed By OPM At St. Louis

St. Louis

• • • The Eighth Federal Reserve District has 64 small shops with the necessary precision equipment for producing punches, tools and dies for the small arms plant being erected in St. Louis and similar defense industries, a survey by Frank J. McDevitt, manager of the St. Louis office of the division of contract distribution, Office of Production Management, revealed. Defense orders have been given to only 21 of the shops.

Of the 64 shops with precision equipment, 26 are in St. Louis and two elsewhere in eastern Missouri, 16 in Indiana, nine in Kentucky, eight in southern Illinois and three in Tennessee.

NEWS OF INDUSTRY

7000 Aircraft on Order for Canada, Howe Announces

Ottawa

• • • More than 7000 aircraft are on order for Canada, the majority of which will be built in the Dominion, C. D. Howe, Minister of Munitions and Supply, has announced. "We are building 13 different types of aircraft," he stated. "We hope ultimately to narrow these down to six or seven."

An increasing number of instruments also is being produced in the Dominion, and within another 12 months, we will produce, with one or two exceptions, every regular type of power plant and flight instrument." With regard to maintenance of aircraft, Mr. Howe stated, the Overhaul and Repair Division of the Department's Aircraft Production Branch now has 29 plants scattered from Halifax to Vancouver.

SHELL-CHECKER: This Sheffield Multicheck Electrigage is furnished with three sets of interchangeable gaging heads for checking 75 and 90-mm. shells and 3-in. anti-aircraft shells. Each gaging head is shown with its corresponding set of "go" and "not go" master gage plugs. For each size of shell, six diameters are gaged simultaneously, colored light indicating whether the particular diameter is on size, oversize or undersize.



Electric Truck Bookings Decline to 227 Units in August

• • • August bookings of electric industrial trucks were a little lower than those for July, figures compiled by the Industrial Truck Statistical Association indicate. There were 227 units booked during August compared with 273 units booked in July. Total net value for chassis only at factories was \$745,599.25 compared with \$1,059,093 in July.

August orders included 30 non-elevating platform trucks with a total net value at factories of \$63,339; 155 cantilever trucks had a total net value at factories of \$594,037.25; 13 tractors, both light and heavy duty, had a total net value at factories of \$21,755; 10 crane trucks had a total net value at factories of \$62,508; and one 2000-lb. special scoop shovel truck had a total net value at factory of \$3960.

Ore Deliveries From Russia Will Extend 2 to 3 Years

Washington

• • • None of the supplies of manganese ore, chromite, asbestos and platinum to be purchased under the \$100,000,000 contract made by the Defense Supplies Corp., RFC subsidiary, with Russia's Amtorg Trading Corp. have been shipped but probably will be delivered over a period of two or three years, according to Federal Loan Administrator Jesse H. Jones. This deal is said to be a forerunner to a contemplated large munitions purchase loan to Russia. Mr. Jones said he was uncertain whether the Administration now has authority or must obtain Congressional sanction to make the loan.

In announcing the contract, made at the request of President Roosevelt, Mr. Jones said estimates of the value and quantity of each product were not available. It was explained purchases will be made at market prices prevailing at the time of delivery, or the average of the prices for a few weeks immediately before or after shipment.

The contract made with Russia is similar to that made first with China. It is designed to bolster her dollar exchange for the purchase of American war materials and foodstuffs as well as to make possible importation of Russian raw materials "to expedite our own national defense program," the President told Mr. Jones. As requested by the President, it was agreed to advance Amtorg up to \$50,000,000 and it was stated that the remaining \$50,000,000 will be advanced as needed.

Sailplane Plant Being Built

Chicago

• • • Construction has started on what is believed to be the first plant designed for exclusive manufacture of sailplanes. Located 22 miles from here, the plant will be operated by the Frankfort Sailplane Co. The company has been making one glider per week at a small plant in Joliet, Ill., but new facilities will require about twice as many employees and production will be stepped up.

— NEWS OF THE WEST COAST —



Photo by British-Combine

SPITFIRE IN FLIGHT: The above photograph shows the graceful lines of the British Vicker Supermarine Spitfire fighter plane.

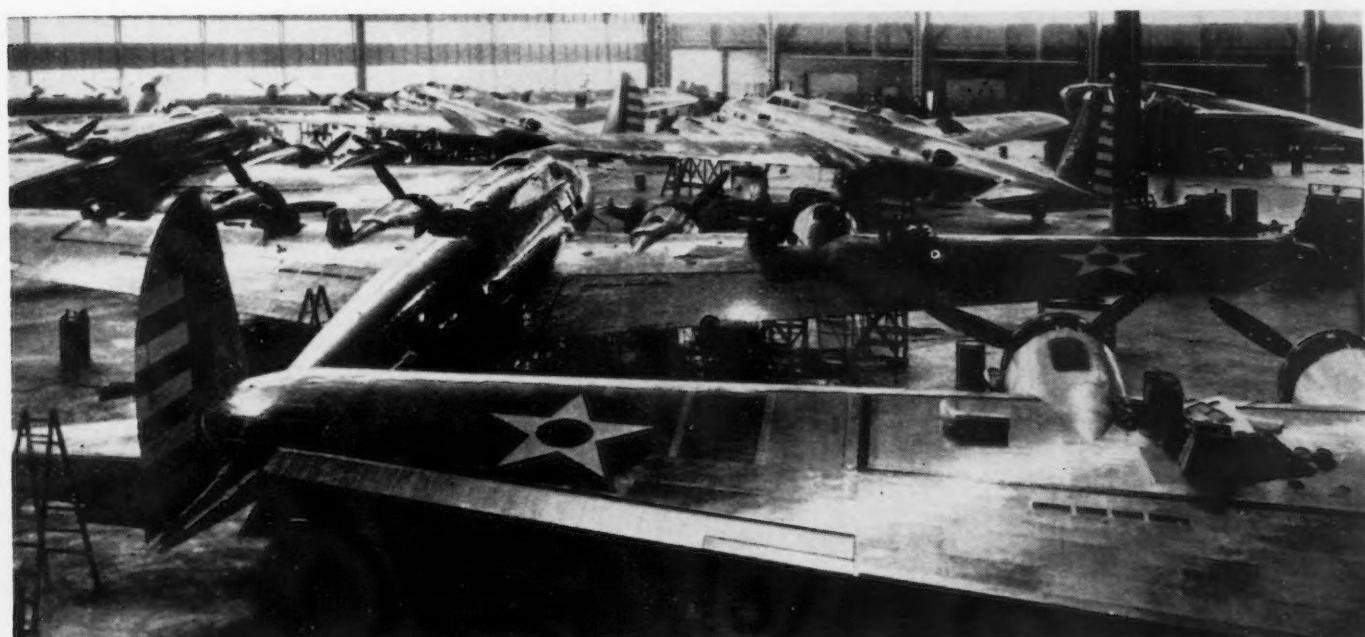


Photo by International

MORE FORTRESSES: In this new 300-ft. bay of the new Boeing Aircraft plant in Seattle are shown more than a million dollars worth of "Flying Fortresses" of the type being used by the RAF to bomb Germany.

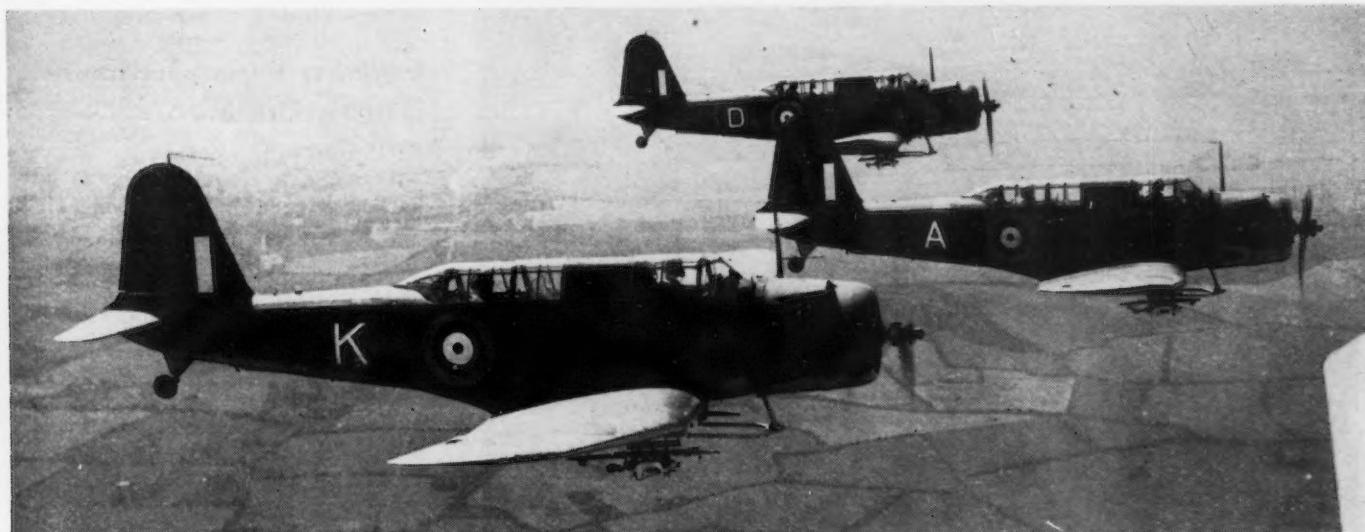


Photo by British-Combine

LATEST U. S. PLANE FOR BRITAIN: The Vought-Sikorski "Chesapeake" dive-bomber now in service with the British fleet air arm is one of the latest American aircraft made available to Great Britain under the Lease-Lend Act. The Navy calls the Chesapeake the "Cheesecake."

Defense Clinic at Toledo Succeeds in Uncovering Capacity

Toledo

• • • An informal poll conducted by THE IRON AGE among representatives of prime contractors at Toledo, the third stop of Ohio's

Defense Caravan, revealed considerable satisfaction with results in finding sub-contractors at that meeting as well as at the previous two held in Mansfield and Columbus. No contracts were signed since such action depends upon subsequent negotiations, but contractors discovered surprising amounts of available capacity of various types in Ohio plants.

The initial timidity of the "little



AT DEFENSE CLINIC: Standing around the Thompson Aircraft Products Co. table at Toledo's defense clinic at the Commodore Perry Hotel are, left to right, L. K. Carroll, of the Clyde Casting Co., Fremont; Willis Rhoda, of the Clyde Casting Co.; G. M. Smith, superintendent, and Albert P. Fall, president of the Wel-Even Piston Ring Co., Toledo; P. B. Lerch, general superintendent of the Thompson Co.; A. W. Tinay, of the Thompson Co.; A. D. Geyer and C. A. Brickner, of the Buckeye Brass & Aluminum Foundry Co., Tiffin. Below, Toledo manufacturers examining blueprints are, left to right: S. N. Sloan, president of the Mayle Mfg. Co.; E. A. Hall, president of the Hall Mfg. Co.; Frank Graper, president of the Acklin Stamping Co., and Geoffrey R. Bennett, general manager of the Toledo Scale Co.



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fellows" could be seen thawing out into enthusiastic interest as prime contractors asked: "Have you any screw machines you would like us to put to work? Can you handle forgings if we supply the blanks? Just tell us what machinery you have and we will do the rest."

Meanwhile, skeptical sub-contractors who wondered how they were going to train their employees to handle defense work, were having their fears set at rest by representatives of the OPM's Training Within Industry, who arrange to send experts where needed.

The Toledo clinic brought together representatives of some 25 prime contractors and about 500 potential sub-contractors, who studied various sample articles to be made as well as plans for more intricate projects. Up to and including that meeting, prospective sub-contractors had been unearthed to handle screw machine work, castings, plastic parts, drilling and jig work, as well as miscellaneous rubber goods. On the other hand, the placing of forging and securing of heavy machinery was progressing at a slow pace, although prime contractors offering such business were still hopeful of better success at future clinics.

One prime contractor observed that sub-contractors were often not well prepared for the clinics, and did not have available a list of the machinery in their plants. On the other hand, most people agreed that the meetings had been of considerable educational value, in addition to yielding actual results thus far.

Germany Denied Turkish Chrome Ore Supplies

• • • German efforts to acquire chrome ore from Turkey have failed, according to a despatch in the New York Times from Ankara, Turkey. The Turkish government advised Germany that it would have to obtain British permission first, as Britain already has contracted for Turkey's entire chrome output.

Russia and Turkey are two of the largest producers of chromite. In years preceding the war each country was able to produce in excess of 200,000 tons of ore a year. Germany proper has no chromite deposits.

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SPAB Spurs Expansion of Capacity in 3 Metal Fields

Washington

• • • SPAB has directed that expansion of aluminum, magnesium and copper capacity already planned but not yet actually set in motion be completed as soon as possible.

In aluminum, existing plans call for increased production of 600,000,000 lb. per year. Negotiations for the building of the new capacity are progressing well, SPAB announced, and emphasis will be placed on getting the new plants built and into operation as quickly as possible.

Expansion of copper production was called for through a broad campaign designed to increase the available supply and to reduce the demand for the metal. SPAB estimated that between 250,000 and 350,000 tons could be saved annually by cutting down on unnecessary uses, and instructed the executive director to seek to bring that reduction into effect. It also ordered a study of plans to increase domestic production through a variety of methods for getting greater production out of existing American mines.

First Navy Award in Indiana Goes to Maker of Bearings

Indianapolis

• • • It was announced by the Navy Department that the Bantam Bearings Corp. of South Bend is the first concern in this state to receive the Naval Ordnance "E" award.

The "E" award is given to firms who cooperate unusually with the government in assisting in defense efforts. So far only 25 such awards have been given.

Aviation Laboratory Will Employ 525 At Cleveland

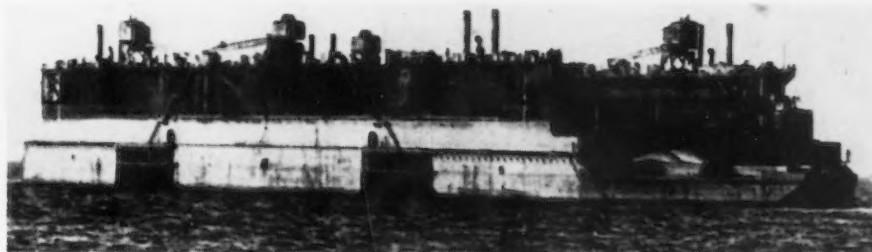
Cleveland

• • • The new \$13,000,000 government aviation laboratory at Cleveland Airport will employ 525 persons instead of 300 originally expected to comprise the entire staff. From 200 to 300 experts now at Langley Field, Va., will be transferred here and in addition several hundred technicians will be hired on the basis of competitive Civil Service examinations.

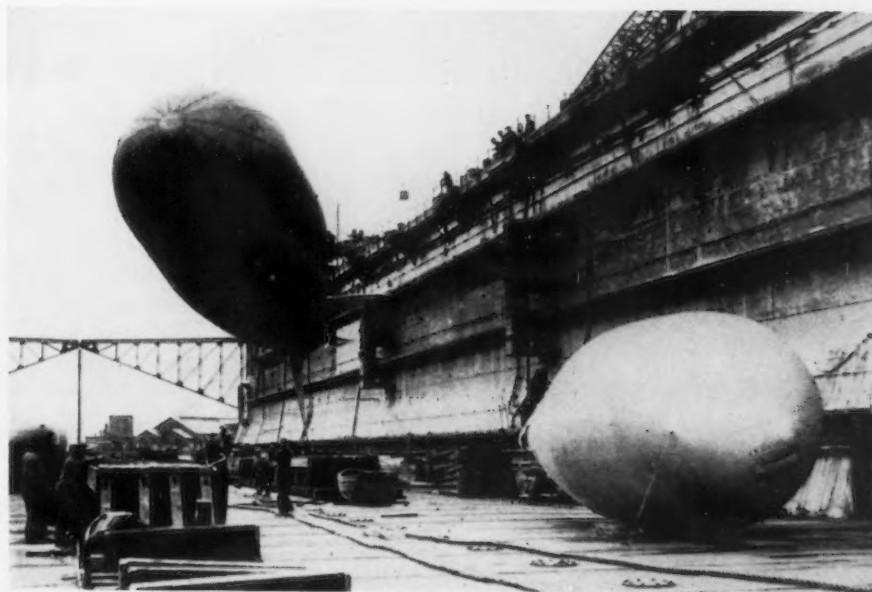


Photos by British Combine

GIANT FLOATING DOCK: This huge floating dock, big enough to accommodate battleships of the Prince of Wales class, recently was towed several hundred miles by three tugs. Above is a distant view of the dock.



CLOSEUP: This photograph of the floating dock was taken from one of the escorting vessels.



INSIDE: Men from the RAF and the British Navy prepare the balloon defense for the dock before the start of the long voyage.

Job Finding Service Expanded to Include Enlisted Branches

• • • The same assistance in finding jobs will be given men completing their terms of service in the Regular Army, Navy or Marine Corps as to selectees and members of the National Guard, it has been announced by Brig. Gen. Lewis B. Hershey, director of Selective Service, who also urged the patriotic cooperation of all employers to see that every returning soldier is given prompt and proper civilian employment.

The Selective Service System has put into operation a carefully studied and organized reemployment program that functions primarily through its local boards.

"Not only are former employers of these returning soldiers re-

quired by the Selective Training and Service Act to restore them to their former positions or to positions of like seniority, status and pay, but they also have a high moral and patriotic responsibility for doing so," said General Hershey. "The least return that should be given to these returning soldiers should be the opportunity to resume their civilian status as it was when they answered the country's call."

Employers can best aid to reestablishing returning soldiers in civil life, General Hershey said, by working with the reemployment committeemen of their local Selective Service Boards and with their State Employment Offices. He suggested that they immediately advise these agencies of all jobs available and continue to do so from time to time.

General Hershey has addressed a letter to "Each Soldier About to

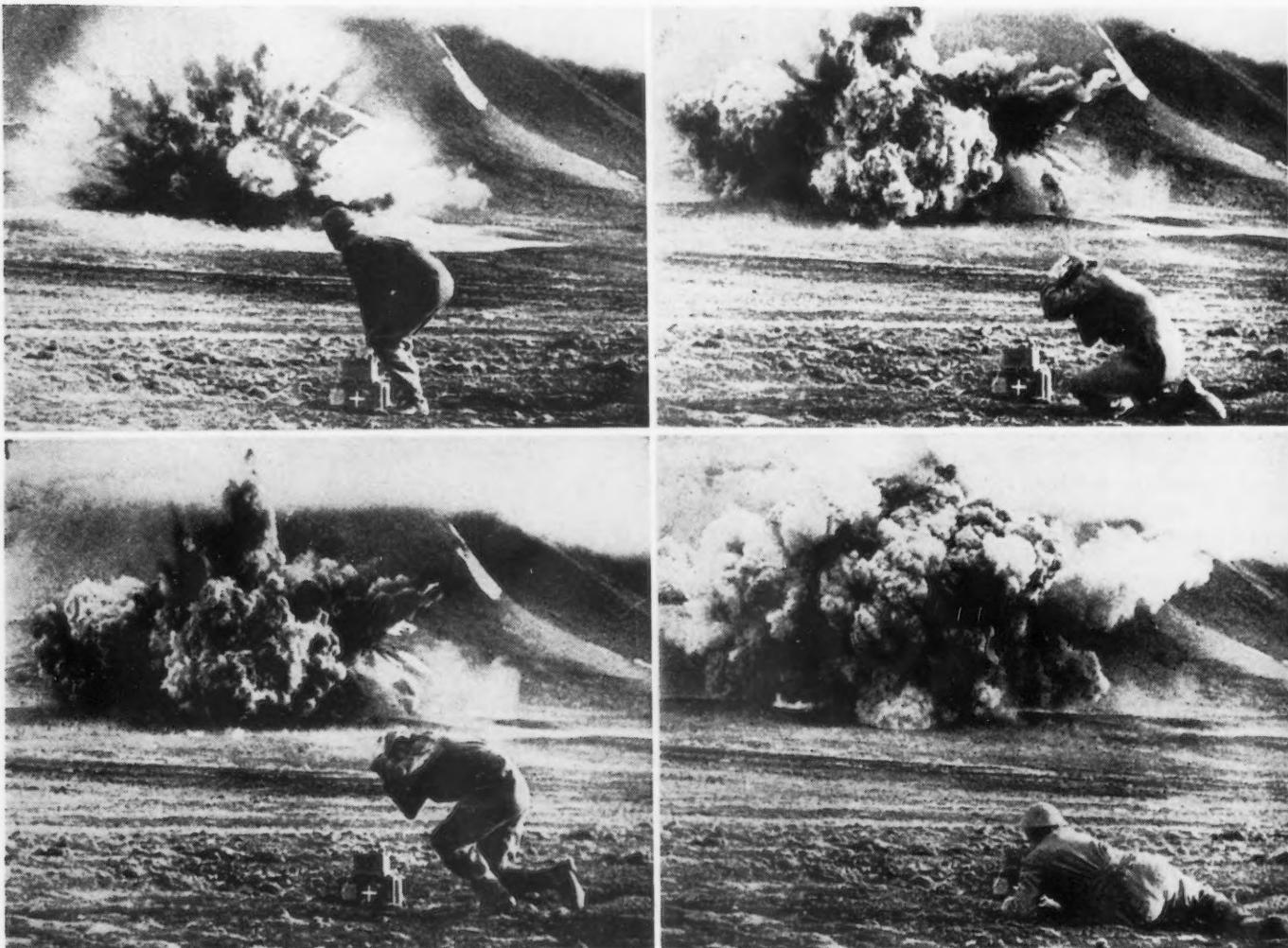
Return to Civil Life," which is being distributed through the War Department, pointing out there is a reemployment committeeman connected with each local board. The letter also calls to the attention of soldiers about to return to civil life that each will receive, through military channels, a form with which he should state his civilian experience and other data that will be helpful in finding him a suitable job.

Syracuse Purchasing Show Will Commence Oct. 1

Syracuse, N. Y.

• • • The Purchasing Agents Association of Syracuse and Central New York will hold its seventh annual exhibit at the Onondaga Hotel, Syracuse, Oct. 1, 2, and 3. Over sixty exhibits of new tooling, processes, and kindred aids to industry will be on display.

COAL BLAST AT SPITZBERGEN: These photographs show the actual blowing up of one of the coal mines destroyed by British raiders on the island of Spitzbergen. The soldier is shown (top) pushing the plunger that exploded the charge, dropping from the force of the concussion, holding his head and then turning to watch the results of the explosion.



News of the Day Newsreel from International

NEWS OF INDUSTRY

18 Committees of Steel Executives Are Appointed

Washington

• • • Appointment of 18 subcommittees of the Iron and Steel Defense Industry Advisory Committee was announced on Monday by the OPM Bureau of Clearance of Defense Industry Advisory Committees.

The subcommittees were selected by A. D. Whiteside, government presiding officer, from nominations made by the industry. They include:

Alloy Bars, Tool Steel, Stainless Steel Subcommittee

J. H. Parker, Carpenter Steel Co., Reading, Pa.; J. M. Schlendorf, Republic Steel Corp., Cleveland; A. T. Galbraith, Crucible Steel Co. of America, New York; S. D. Williams, Copperweld Steel Co., Warren, Ohio; H. G. Batcheller, Allegheny-Ludlum Steel Corp., Brackenridge, Pa.; C. E. Tuttle, Rustless Iron & Steel Corp., Baltimore; Roy C. McKenna, Vanadium-Alloy Steel Co., Latrobe, Pa.; Henry Timken, Jr., Timken Roller Bearing Co., Canton, Ohio; Frank Gibbons, Carnegie-Illinois Steel Corp., Pittsburgh; Rufus Tucker, Bethlehem Steel Corp., Bethlehem, Pa.; J. O. Rinek, Universal Cyclops Steel Corp., Bridgeville, Pa.

Tubular Subcommittee

E. P. Corey, Youngstown Sheet & Tube Co., Youngstown; J. K. Beeson, Pittsburgh Steel Co., Pittsburgh; W. F. McConnor, National Tube Co., Pittsburgh; F. J. O'Brien, Globe Steel Tubes Co., Milwaukee; William C. Connolly, Ohio Seamless Tube Co., Shelby, Ohio; J. E. Holmes, Republic Steel Corp.; Walter Wiewell, Jones & Laughlin Steel Co., Pittsburgh; R. R. Lawson, Summerill Tubing Co., Bridgeport, Conn.; Boyd Watson, Spang-Chalfant, Inc., Pittsburgh.

Sheets, Strip and Tin Plate

George Totten, Carnegie-Illinois Steel Corp.; Arthur Long, Youngstown Sheet & Tube Co.; N. C. Reed, Wheeling Steel Corp., Wheeling, W. Va.; Thomas M. Galbreath, Sharon Steel Co., Sharon, Pa.; J. A. Henry, National Steel Corp., Pittsburgh; F. H. Loomis, Republic Steel Corp.; W. J. Adamson, Allegheny-Ludlum Steel Corp.; Benton Wilmer, Inland Steel Co., Chicago; R. C. Todd, American Rolling Mill Co., Middletown, Ohio; K. L. Griffith, Bethlehem Steel Co.; N. B. Randolph, Granite City Steel Co., Granite City, Illinois.

Rails and Accessories

H. E. Stall, Bethlehem Steel Co.; N. H. Orr, Colorado Fuel & Iron Corp., Denver; W. J. Hammond, Inland Steel Co., Chicago; J. C. Dilworth, Carnegie-Illinois Steel Corp.; M. H. Geisking, Tennessee Coal, Iron & Railroad Co.

Carbon Bars, Semi-Finished and Shell Steel

W. F. Vosmer, Republic Steel Corp.; L. B. Worthington, Carnegie-Illinois Steel Corp.; L. R. Steuer, Bethlehem Steel Co.; C. H. Longfield, Youngstown Sheet & Tube Co.; E. L. Wetstein, National Steel Corp.; R. T. Rowles, Jones & Laughlin Steel Corp.; N. H. Orr, Colorado Fuel & Iron Corp.; J. B. Andrews, Jr., Andrews Steel Co., Newport, Ky.; Otto Seidenbecker, Wisconsin Steel Co., Chicago, Ill.

Wire Products

John May, American Steel & Wire Co., Cleveland; C. F. Stone, Atlantic Steel Co., Atlanta, Ga.; J. K. Beeson, Pittsburgh Steel Co.; John P. Distler, Republic Steel Corp.; J. F. Hazen, Bethlehem Steel Co.; Ford Schusler, Keystone Steel & Wire Co., Peoria, Ill.; A. R. Baldwin, Tennessee Coal, Iron & Railroad Co.; N. H. Orr, Colorado Fuel & Iron Co.; D. Rollins, Wickwire Spencer Steel Co., New York.

Plates and Shapes

C. M. Daniels, Bethlehem Steel Co.; A. C. Roeth, Inland Steel Co.; A. H. Warren, Jr., Carnegie-Illinois Steel Corp.; V. A. Jevon, Jones & Laughlin Steel Corp.; Paul M. King, Worth Steel Co., Claymont, Del.; M. H. Geisking, Tennessee Coal, Iron & Railroad Co.; G. S. Eastburn, Central Iron & Steel Co., Harrisburg, Pa.; W. F. Posmer, Republic Steel Corp.

Warehouse

R. J. Stayman, Carnegie-Illinois Steel Corp.; Joseph L. Block, Inland Steel Co.; N. W. Foy, Republic Steel Corp.; J. V. Honeycutt, Bethlehem Steel Co.; R. M. Allen, Allegheny-Ludlum Steel Corp.; N. D. Scott, Wheeling Steel Corp.; E. P. Severns, Continental Steel Corp., Kokomo, Ind.; Tracy Manville, Columbia Steel & Shafting Co., Pittsburgh.

Ore Subcommittee

Elton Hoyt, Pickands, Mather & Co., Cleveland; J. G. Munson, U. S. Steel Corp. of Delaware, Pittsburgh; E. B. Greene, Cleveland-Cliffs Iron Co., Cleveland; H. A. Berg, Woodward Iron Co., Woodward, Ala.; Patrick Butler, Butler Brothers, St. Paul.

Cold Finished Bars

J. T. Somers, Wyckoff Drawn Steel Co., Pittsburgh; C. F. Goldcamp, Jones & Laughlin Steel Corp.; Tracy Manville, Columbia Steel & Shafting Co.; W. R. Howell, Bliss & Laughlin, Inc., Harvey, Ill.; R. E. Fitzsimons, The Fitzsimons Co., Youngstown, Ohio; M. E. O'Brien, Inland Steel Corp., Chicago.

Pig Iron

J. T. Whiting, Alan Wood Steel Co., Conshohocken, Pa.; G. W. Striebing, Interlake Iron Corp., Chicago; A. M. Harper, Carnegie-Illinois Steel Corp.; H. M. Wilson, Shenango Furnace Co., Pittsburgh; R. M. Marshall, Pittsburgh Coke & Iron Co., Pittsburgh; Kay Ford, Hanna Furnace Corp., Buffalo; H. A. Berg, Woodward Iron Co., Woodward, Ala.; Robert E. Brooke, The E. & G. Brooke Iron Co., Birdsboro, Pa.

Scrap

R. W. Wolcott, Lukens Steel Co., Coatesville, Pa.; C. A. Ilgenfritz, Republic Steel Corp.; C. R. Miller, Jr., U. S. Steel Corp. of Delaware, Pittsburgh; H. E. Paper, The Stanley Works, New Britain, Conn.; Wilmer Murphy, National Steel Corp.; William McMillan, National Malleable & Steel Casting Co., Cleveland; Leigh B. Block, Inland Steel Corp.; W. A. Givens, Allegheny Ludlum Steel Corp.; Newman Ebersole, American Rolling Mill Co.; C. R. Holton, Bethlehem Steel Corp.

Cast Iron Pipe

N. F. S. Russell, U. S. Pipe Foundry Co., Burlington, N. J.; W. D. Moore, American Cast Iron Pipe Co., Birmingham; Spencer L. Hazard, Florence Pipe Foundry & Machine Co., Lynchburg, Va.; J. D. Capron, Glamorgan Pipe & Foundry Co., Lynchburg, Va.; Kent Clow, Jr., James B. Clow & Sons, Chicago.

Forgings and Armor Plate

H. F. Weaver, Bethlehem Steel Co.; Emil Lang, Erie Forge Co., Erie, Pa.; R. B. Heppenstall, Happenstall Co., Pittsburgh; H. H. Ziesing, The Midvale Co., Nicetown, Philadelphia; William Finkl, A. Finkl & Sons Co., Chicago; R. B. Cooney, Carnegie-Illinois Steel Corp., Pittsburgh, Pa.

Statistics, Codification and Forms

P. F. Boyer, Republic Steel Corp.; W. J. Creighton, Jones & Laughlin Steel Corp.; J. H. Hall, Youngstown Sheet & Tube Co.; F. M. Hesse, National Steel Corp.; M. D. Howell, United States Steel Corp.; C. L. Kingsbury, American Rolling Mill Co.; F. A. Shick, Bethlehem Steel Co.

Plant Expansion

Quincy Bent, Bethlehem Steel Corp.; Wm. B. Gillies, Youngstown Sheet & Tube Co.; J. E. Lose, Carnegie-Illinois Steel Corp.; W. Sykes, Inland Steel Co.; C. M. White, Republic Steel Corp.; J. T. Whiting, Alan Wood Steel Co.; H. A. Berg, Woodward Iron Co.; F. B. Lounsbury, Allegheny-Ludlum Steel Corp.; G. E. Rose, Wisconsin Steel Corp.

Steel Castings

F. B. Ernst, American Steel Foundries, Chicago; W. H. Worriow, Lebanon Steel Foundry, Lebanon, Pa.; Charles P. Whitehead, General Steel Castings Corp., Eddystone, Pa.; John E. McCauley, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.; Don Bakewell, Blaw-Knox Co., Pittsburgh.

Research and Conservation

C. H. Weikel, Bethlehem Steel Corp.; D. R. G. Cowan, Republic Steel Corp.; K. J. Evans, Inland Steel Co.; K. G. Fuller, U. S. Steel Corp. of Delaware; H. K. Weir, National Steel Corp.; Vere Brown, Allegheny-Ludlum Steel Corp.

General Metals Order No. 1 Revoked by Nelson

Washington

• • • Because a number of the materials, including iron and steel products and copper, have been placed under industry-wide control and therefore removed from its provisions, General Metals Order No. 1, issued on May 1 by the OPM Priority Division, was revoked on Monday by an order signed by Priority Director Donald M. Nelson. It was stated that the termination of General Metals Order No. 1, which placed 16 metals under inventory control, does not lift the restrictions it imposed, however, as these are included in priorities regulation No. 1 issued Aug. 27.

Mine Repair Preference

Rating Revised to A-8

Washington

• • • Amending its previous order covering repair and maintenance plan for mines, the OPM priorities division on Tuesday changed the original A-3 rating to A-8. The A-3 rating had been assigned to deliveries of certain repair, maintenance and supply material.

This newly assigned A-8 rating has also been broadened for application to mines outside the United States when such action is approved by the director of priorities.

Maximum Coke Prices Announced by OPA

(Price Schedule No. 29, Effective Oct. 1)

By-Product Foundry Coke

Maximum price for by-product foundry coke is the price f.o.b. cars at the governing oven plant (Table I), plus rail transportation and switching charges from that oven to the point of delivery, except in cases listed in Table II and Table III. The governing oven plant is the one which, in terms of its f.o.b. price and transportation charges, provides the lowest delivered price. Prices above the ceilings below may be charged under certain conditions. To meet these conditions (1) a seller must have received from a specified foundry a price in excess of the ceilings during the six months ended Sept. 15 and (2) must file with OPA on or before Sept. 27 a list of foundries to which the exception applies together with the prices at which past sales were made. When delivery is by other than railroad, the maximum delivered price shall be adjusted to provide the customary differential or charge in effect Sept. 18 for such delivery.

TABLE I

Oven Plant	F.O.B. Price in Cars per net ton
Alabama	\$8.50
Chicago	11.50
Ashland, Ky.	10.00
Detroit	11.75
Kearny, N. J.	12.15
Buffalo	11.75
Ironton, Ohio	10.00
Painesville, Ohio	11.25
Portsmouth, Ohio	10.00
Erie, Pa.	11.75
Philadelphia	11.75
Chattanooga, Tenn.	9.00
Fairmont, W. Va.	10.00
Milwaukee	12.25

TABLE II

Maximum Delivered Prices Within Switching Districts	Delivered Price
District	
Chicago	\$12.25
St. Louis, Mo., and East	
St. Louis, Ill.	12.02
Indianapolis	12.00
Terre Haute, Ind.	12.00
Detroit	12.25
Buffalo	12.50
Cincinnati	11.75
Cleveland	12.30
Erie, Pa.	12.25
Philadelphia	12.38
St. Paul and Minneapolis	14.00

TABLE III

Shipments to West Coast

On shipments to the states of California, Oregon and Washington, the governing oven plant may be Chicago; provided, that when shipment is from the oven plants listed in Table I, the maximum delivered price may not exceed the f.o.b. oven plant price at such oven plants plus transportation charges.

New England Area

Maximum delivered price in the states of Connecticut, Rhode Island, Massachusetts, New Hampshire, Vermont, Maine, and in the adjoining areas of New York which have customarily been included within the New England shipping area, shall be \$13.75 per net ton, less \$0.15 per ton discount for cash ten days.

Shipments from Swedeland

Whenever shipment is from Swedeland, Pa., the maximum delivered price shall be the price provided in Table I or the price listed below, whichever is lower, except when prices listed under NEW ENGLAND or WEST COAST are applicable.

When the railroad freight rate for by-product foundry coke from Swedeland to the place of delivery, including switching charges, is:

Freight Rate Per Net Ton	The Maximum Price Per Net Ton Shall Be Delivered
\$0.68 and less	\$12.38
\$0.69 to \$0.96 inclusive	12.40
\$0.97 to \$1.66 inclusive	12.45
\$1.67 to \$2.24 inclusive	12.70
\$2.25 to \$2.50 inclusive	12.80
\$2.51 to \$2.85 inclusive	12.95
\$2.86 and over	10.35*

*F.O.B. Oven Plant, except on deliveries to be made in the Cumberland valley and central Pennsylvania, the price shall be \$10 per net ton, f.o.b. oven plant.

Furnace Coke

The maximum price, f.o.b. oven, on by-product furnace coke, shall be 75c. per net ton above the weighted average price, f.o.b. oven, at which deliveries were made during the first quarter of 1941. The weighted average price means the average of the prices for which by-product furnace coke was sold during the first three months of 1941, weighted by the tons sold at each price. Producers and sellers of by-product furnace coke are required to file with OPA, on or before September 27, their prices and quantities sold during the first quarter of 1941.

By-Product Coke

Prices Frozen Oct. 1

Washington

• • • Effective Oct. 1, prices for by-product foundry and by-product furnace coke were frozen at approximately current levels in price schedule No. 29 announced last Thursday by Price Administrator Leon Henderson. It was stated that prompt action will be taken to establish ceiling prices for beehive, domestic or other kinds of coke, "when and if it becomes necessary."

Due to the complexity of the prevailing price structure of by-product coke several exceptions were made to the general schedule provisions. The maximum price, f.o.b. oven, on by-product furnace coke was set at 75c a net ton above the weighted average at which deliveries were made during the first quarter of 1941.

In order not to disturb, for the time being, existing relationships between coke producers and foundries using particular grades of coke, the schedule allows prices above the ceiling on by-product foundry coke to be charged under certain conditions. To qualify under this exception the seller (1) must have received from such a foundry a price in excess of the ceiling price during the six months ending Sept. 15, and (2) must file with OPA on or before Sept. 27, a list of the foundries to which the exception applies, together with the prices at which past sales were made.

Any producer or buyer of foundry coke in a position to establish that the exception is causing undue hardship, it was announced, may apply to OPA for relief under section 1345.6 of the schedule. This section provides that "persons complaining of hardship or inequity in the operation of this schedule may apply to the Office of Price Administration for approval of any modification thereof or exception therefrom."

Prices of by-product furnace coke and by-product foundry coke, it was stated, are now from \$1 to \$1.25 a ton above levels prevailing a year ago.

"Estimates place the 1941 production of by-product coke at roughly 60,000,000 tons," said the

OPA Statement. "About 75 per cent of this total is produced and consumed by the large steel companies in the production of pig iron and, hence, is not sold in the open market."

The order requires that both buyers and sellers of by-product foundry and furnace coke shall, for OPA inspection, keep records of transactions after Oct. 1 for a period of not less than one year. The records are to include dates, addresses, prices and quantities of grades sold, on hand and on order at the close of each calendar month. Threat of government action is made for violations of the order.

Metals on New Defense Housing Critical List

Washington

• • • The OPM priorities division made effective early this week a priority assistance plan for building 200,000 privately financed defense housing units. The action creates a defense housing critical list, establishes a system for granting project preference ratings, and defines defense housing as including family units of not more than \$6000 in value and suitable or necessary for defense workers.

The defense housing critical list includes a 7-page listing of iron and steel items essential to housing construction, electrical equipment, plumbing and gas distribution systems, heating and ventilating equipment; household equipment, and land development items.

While all defense housing ratings will be in the defense or "A" class, the highest rating goes to projects under construction on Sept. 1, the next highest for remodeling and rehabilitation to accommodate defense workers, and lower ratings for new construction for rent and for sale.

After qualifying as defense housing, a rating assigned in the field by the priorities division to the particular job involved on a project rating form, will be given to the builder of private housing. The builder can extend the rating by executing a copy of the order and serving it on his suppliers. The suppliers in turn can extend the rating to their own suppliers in the same way.

July Steel Exports Rise to 478,016 Tons

• • • Exports of iron and steel products in July, 478,016 gross tons valued at \$34,855,419, showed a gain over the June figure of 398,667 tons valued at \$35,213,412, but were well below the July, 1940, figure of 707,809 tons valued at \$39,512,005, according to the Department of Commerce.

Cumulative seven months exports totaled 3,494,684 tons valued at \$258,057,699 as compared with exports of 3,472,752 tons valued at \$237,340,096 during the comparable period of 1940.

Non-alloy ingots, blooms, etc., were, in point of tonnage, the most important items in the July trade, the total of 115,778 tons being almost double the 58,595 tons exported in June. Pig iron took second place, the 63,057 tons exported in July being 27,655 tons above the June figure of 35,402 tons. Non-alloy "black" steel sheets, 36,727 tons, ranked third, followed by tin plate and taggers' tin with its 23,066-ton total.

At 59,905 gross tons valued at

\$1,160,533, exports of scrap in July registered a slight gain over June's trade of 59,018 tons valued at \$1,059,524. Exports in July, 1940, had amounted to 327,129 tons valued at \$5,459,356.

Cumulative exports for 1941 totaled 475,785 tons valued at \$9,271,884 compared to 1,805,935 tons valued at \$30,551,194 for the first seven months of 1940.

Iron and steel scrap accounted for 58,637 tons of the July total, this figure being further broken down as follows: No. 1 heavy melting, 14,689 tons; No. 2 heavy melting, 30,802 tons; baled and bundled, 5255 tons; cast and burnt, 1691 tons; and other iron and steel scrap, 6200 tons.

Tin plate scrap, tin plate circles, strips, cobbles, etc., waste-waste tin plate, and terneplate clippings and scrap were all represented in the remaining 1268 tons of scrap exported.

New OPM Order Sets Auto Spare Part Quota

Washington

• • • Part of OPM's broad program of priorities and limitations in the automotive field, Director of Priorities Donald M. Nelson last Saturday announced two additional orders designed to assure continued operation of passenger cars and light trucks now on the highways by providing for adequate production of replacement parts. One of the orders is Limitation order L-4. The other is preference rating order P-57.

The former order sets a top quota for the production of spare parts for passenger cars and light trucks. Preference Rating Order P-57 extends priority assistance in securing the material needed to manufacture the authorized amounts.

Conforming to recent orders which now control the production of passenger cars and light trucks, L-4 provides that a producer of spare parts for passenger cars and light trucks may, during the period from Sept. 15 to Dec. 31, make 60 per cent of the number of parts sold by him for replacement purposes during the Jan. 1-June 30, 1941, period.

Preference Rating Order P-57 assigns an A-10 rating to deliveries of materials for the manufacture of the listed replacement parts, within the quantities established in the limitation order.

Coming Events

- Sept. 29 to Oct. 2—American Mining Congress-Metal Show, San Francisco.
- Oct. 1 to 4—Electrochemical Society, Fall Meetings, Chicago.
- Oct. 2 and 3—American Hot Dip Galvanizers Ass'n, Inc., Semi-annual Meeting, Netherland Plaza Hotel, Cincinnati.
- Oct. 6 to 10—National Safety Congress and Exposition, Chicago.
- Oct. 8 to 10—Porcelain Enamel Institute, annual forum, Chicago.
- Oct. 14 to 16—American Railway Bridge and Building Ass'n, Chicago.
- Oct. 14 to 17—American Institute of Steel Construction, annual convention, New York.
- Oct. 16 to 18—American Society of Tool Engineers, semi-annual meeting, Toronto.
- Oct. 19 to 24—National Metal Congress, Philadelphia. Annual meeting of American Society for Metals, American Welding Society, American Institute of Mining and Metallurgical Engineers, and Wire Association. Also, Exposition of equipment, materials and processes.
- Oct. 20 to 22—American Gear Manufacturers' Ass'n, Semi-annual Convention, Edgewater Beach Hotel, Chicago.
- Oct. 20 to 22—American Gas Association, Atlantic City, N. J.
- Oct. 23 and 24—Society of Automotive Engineers, Tulsa, Okla.

Roebling Celebrates Its 100th Birthday

• • • On Friday, Sept. 19, the John A. Roebling's Sons Co. celebrated its 100th anniversary. Some 150 editors and publishers of business, industrial and trade publications visited Trenton, N. J., to do honor to one of America's oldest as well as one of its best known industrial concerns and to pay their respects to an able present management as well as to an enviable record of past performance.

The guests in attendance were conducted through the Roebling plants at Trenton and at Roebling, N. J., and had an opportunity to see how effectively this company, noted for peacetime products, had turned over its production to defense. Fully 75 per cent of the Roebling activities in all four of its plants are now devoted to defense purposes.

The visitors also had an opportunity to inspect the research laboratory maintained by the company, which is one of the largest in the country. One of the most spectacular exhibits seen there was the testing to destruction under tension of a 4-in. diameter triple wire cable, which withstood a stress of well over a million pounds before showing signs of failure.

Later, the visitors were guests of the company at dinner at the Nassau Tavern at Princeton, N. J., at which the toastmaster was Robert T. Bowman, director of public relations. Addresses were made by Leon Henderson, price administrator and member of the SPAB; by William A. Anderson, president, and others.

Mr. Henderson made a favorable impression upon his audience both from his grasp of the Roebling historical background and his appraisal of its current economic value as an outstanding exponent of private enterprise. He also reflected an interesting attitude on the part of the price control administration, in declaring his belief that such control should not be carried beyond the emergency but that it should then revert to private enterprise.

John A. Roebling, the founder of the company was born in 1806 and died in 1869. In 1840 he conceived the idea of making a wire rope to take the place of the cum-



PRICE ADMINISTRATOR LEON HENDERSON at the Roebling centennial celebration.

bersome and not too serviceable hempen cables which were used then to pull the amphibian canal boats over hilltops in between-water interludes. The first rope made for this purpose, in 1841 was also the first wire rope made in America. One and one-half inches in diameter, it successfully replaced the cumbersome eight in. hempen cables. This was the birth of the Roebling company which currently employs some 6000 workers.

Shortly after came the conception of the rope suspension bridge principle. It was first applied in 1844 to carry an aqueduct across the Allegheny river. Following this, in 1847, came the Monongahela suspension bridge at Pittsburgh; then the Niagara suspension bridge, first of its kind to carry a fully loaded freight train.

Most famous achievement of John A. Roebling, of course, was the Brooklyn bridge. It was he who initiated the idea and started its construction, meeting accidental death, however, early in its building. His successor and son,

Washington A. Roebling, carried on the work, part of which he was obliged, through severe physical exhaustion to supervise through a telescope from his sick bed. Surviving this experience, however, he lived to participate actively in the management of the company and passed away in 1926.

Two brothers of Col. Washington Roebling, Charles G. and Ferdinand W., carried on the Roebling tradition of successful management and growth. The former was largely responsible for the successful planning and construction of plant facilities and the latter for sales and financial policies.

Three great-great grandsons of John A. Roebling are today active in the management of this company. They are: Joseph M. Roebling, first vice-president; Charles Roebling Tyson, secretary and treasurer; and Ferdinand W. Roebling III, second vice-president and assistant director of engineering, now on leave from the company while he is in active service as a major in the field artillery at Fort Dix.

President of the Roebling company is William A. Anderson, formerly general manager, who has been at the helm as chief executive since 1936.

Use of Pyrites for Pig Iron Making Called "Successful" Buffalo

• • • Production of pig iron in blast furnaces of the Republic Steel Corp. plant here from pyrites cinders, thousands of tons of which had been imported from Canada, was declared "very successful" by a company official this week. The cinders were used instead of iron ore. Use of the cinders has been discontinued, however, due to an inadequate supply.

Use of the iron pyrites, which first had to be "nodulized" in a kiln and fed into the furnace at 2300 deg. F., was in the nature of an experiment which eventually may open the way for use of large quantities of low-grade ores in manufacture of pig iron. Pyrites cinders are an industrial residue with iron content of about 50 per cent. They were shipped here from Sulphide, Ont., near Ottawa, where the material is obtained from the Nichols Chemical Co., Ltd.



Experience of Years

STORED UP

in Helpful Literature...

The pressing demands of the defense program call for the employment of every skill and facility at the disposal of the metal working industries.

Among the resources available is the experience of our technical staff in the solution of problems involving the use of Nickel and its alloys.

This experience has been distilled into helpful literature which deals with the selection, fabrication and uses of these materials. This printed matter is yours for the asking. You are also offered the assistance of our technical staff in solving problems of material arising from the temporary lack of Nickel.

Your inquiries addressed to the Company either for literature or personal consultation will receive prompt attention.

Nickel

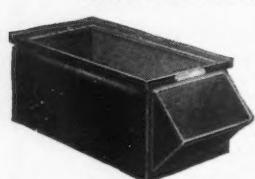
THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET
NEW YORK, N.Y.



SMALL PARTS PLAY A BIG PART IN THIS PRODUCTION DRIVE

There's no over-emphasizing the importance of small parts handling in this all-out job for American Industry. Speedy and efficient handling and storing mean the conservation of much valuable time. Many concerns are finding A-S-E Stacking Boxes and Stack-Units a definite aid in speeding up inter-departmental handling of small parts—breaking bottlenecks and saving important storage space.

A-S-E STACK-UNITS



"pouring" of small parts, resulting in a definite saving in handling time. Can be stacked without tipping, toppling or telescoping from vibration or ordinary impact. Parts are kept visible for quick check-up. Stack-Units are built to special requirements—heavy- or light-gauge, large or small boxes.

A-S-E STACKING BOXES

keep small parts moving faster through the plant. They can be used on any type of conveying system. Built to "take it," they have a full stacking rim that permits stacking to any height. Vertical storage saves valuable floor space. A-S-E Stacking Boxes are made in any size and gauge.



Write today for full information about the time-saving advantages of A-S-E Stacking Boxes and Stack-Units, also about A-S-E Taper Pans, Shop Boxes, Drill and Reamer Cabinets and the many other A-S-E production aids.

ALL-STEEL-EQUIP COMPANY, Inc.
709 JOHN STREET
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Defense Demands Aid Bessemer Steel

Pittsburgh

• • • The current national defense effort is providing a proving ground for the determination of whether the use of bessemer steel will have a definite and lasting rebirth, according to informed opinion here. Currently total production of bessemer steel represents about six and a half to seven per cent of total steel ingots produced.

Some steel officials believe the ratio of bessemer steel production to open hearth steel production should be two or three times what it is at present. They further argue that various bessemer steel applications should be based on physical and chemical research as well as product investigation.

Impartial steel observers believe that the steel industry itself is partly at fault for lack of a more receptive attitude towards bessemer steel because they have unsold this material for the past 20 years in favor of the open-hearth product. Research and experience concerning the application of bessemer steels are now being given a much better hearing, it is said, and have resulted in a substantial increase in new uses and applications.

Some recent applications which hitherto in many instances used open-hearth steel include:

Railroad Material—Larger tonnages of railroad spikes are now being produced from bessemer stock with satisfactory results. Within recent months a number of freight car builders have been using plates and heavy sheets in freight car construction.

Tubular Goods—Recently a far greater tonnage of welded pipe in all sizes, but particularly in the smaller diameters, has been made from bessemer steel.

Farm Implements—Some major companies are now using bessemer steel application in the structural framework of farm implements and the trend is said to be increasing in the industry.

Miscellaneous—Lifting plugs for shells are being fabricated from bessemer steel and certain automobile parts have also been added to the list of applications, with knitting machine parts, pliers and wrenches and turnbuckles.

While the items mentioned above do not represent any substantial tonnage in themselves, taken in the aggregate the increased use of bessemer steel has been substantial. Many other factors will probably enter the picture which will determine whether bessemer steel is to stage a real comeback, among which are the use to which increased bessemer capacity will be applied, permanent lack of scrap for open hearth consumption, and more intensive research into the limitations of bessemer steel application.

ENAMELERS FIGHT FOR LIFE: Sixty eight representatives of porcelain enameling companies met in Cincinnati recently and appointed a committee to devise plans to keep enameling shops open despite tightening priorities. R. G. Carlton (above), chairman of the new committee, is shown making some suggestions. Also shown in the photo, left to right, are: E. H. Weil, Vitreous Steel Products Co.; R. I. Wells, Chicago Porcelain Enameling Co.; J. W. Bestler, Chicago Porcelain Enameling Co.; R. B. Jenkins, Briggs Mfg. Co., Plumbing Ware Division; R. A. Dadisman, American Rolling Mill Co.; H. V. Mercer, American Rolling Mill Co.; Tom Byrd, American Rolling Mill Co.; P. B. McBride, Porcelain Metals Corp. of Louisville; W. W. Galbreath, Alliance Porcelain Products Co.; R. H. Turk, Porcelain Enamel & Mfg. Co.



INDUSTRY

Committees Named to Aid On Railroad Supply Matters

Washington

• • • Defense Transportation Commissioner Ralph Budd has announced appointment of two committees to represent the transportation division in working with SPAB on matters relating to the supply of materials required for construction of railroad freight cars and steam locomotives. The membership of the committees is:

Committee for the Carbuilding Industry: C. A. Liddle, president, Pullman-Standard Car Mfg. Co., Chicago; C. J. Hardy, president, American Car & Foundry Co., New York; Lester N. Selig, president General-American Transportation Corp., Chicago; Edwin Hodge, Jr., president, Greenville Steel Car Co., Greenville, Pa.; A. Van Hassel, president, Magor Car Corp., Passaic, N. J.; F. A. Livingston, president, Ralston Steel Car Co., East Columbus, Ohio; and J. F. MacEnulty president, Pressed Steel Car Co., Pittsburgh.

Committee for the Steam Locomotive Industry: W. F. Farrell, General Purchasing Agent, American Locomotive Co., New York; W. H. Harman, vice-president, Baldwin Locomotive Works, Philadelphia; L. A. Larsen, vice-president, Lima, Locomotive Works, Inc., Lima, Ohio; and G. W. Alcock, secretary, Locomotive Institute, New York.

Dr. Cox Heads New OPM Civilian Supply Division

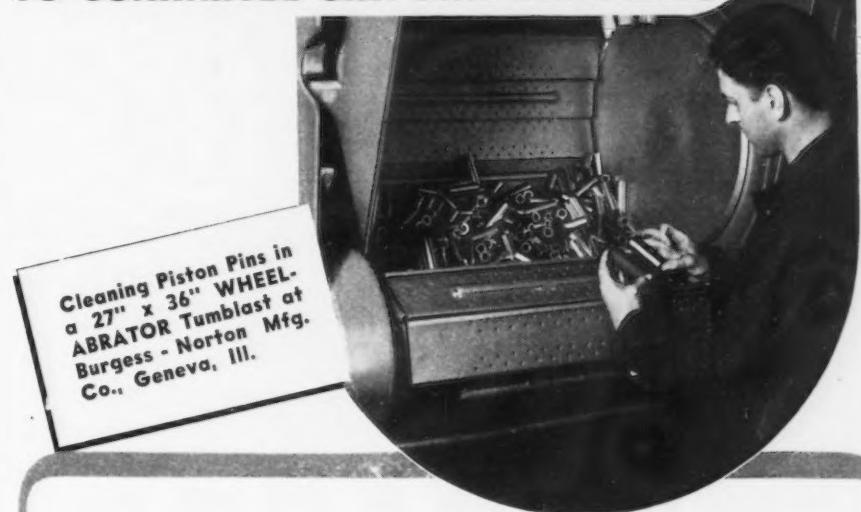
• • • Dr. Reavis Cox, chairman of the marketing department, Wharton School of Finance, University of Pennsylvania, has been designated by Leon Henderson as supervisor of the industry branches in OPM's new Division of Civilian Supply. Mr. Henderson also named additional appointees as chiefs of industry branches under his division.

OPM Priorities Office Is Established in Milwaukee

Milwaukee

• • • Defense manufacture will be speeded up in this area by the action of the Chicago OPM office in establishing a priorities office here.

How WHEELABRATOR AIRLESS BLAST CLEANING ENABLES PISTON PIN MANUFACTURER TO GUARANTEE UNIFORM HARDNESS



Cleaning Piston Pins in
a 27" x 36" WHEEL-
ABRATOR Tumbler at
Burgess - Norton Mfg.
Co., Geneva, Ill.

How Burgess-Norton Mfg. Co., Geneva, Ill., licked a tough piston pin cleaning job—and how they found an accurate way to check the outside surface hardness at the same time is told here in the words of F. E. Burgess:

"Some five or six years ago we installed one of your 27" x 36" WHEELABRATOR Tumbler. This installation was made after investigating various types of sandblasting equipment, none of which seemed to meet our requirements.

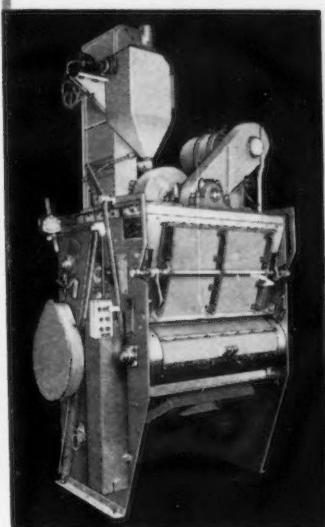
"We were interested in a method of removing scale from the holes of piston pins. We manufacture a great many piston pins for original equipment and the holes in these pins run from $\frac{1}{4}$ " to 2" in diameter with a corresponding variation in O. D.'s and lengths. Your WHEELABRATOR, up to the time that we put it in, was the only equipment that we had been able to find that would successfully remove the scale from the holes. Almost any type of equipment

that we investigated would satisfactorily remove the scale from the outside of the parts.

"After making the installation and using your machine for a short time, it developed that your machine not only cleaned the holes of our parts very satisfactorily, but gave us a check for outside surface hardness, which in our opinion was as equally important as the purpose for which the machine was originally purchased.

"By visually inspecting piston pins after going through the WHEELABRATOR, we are able to detect readily any soft spotted condition, which condition is periodically prevalent in the making of piston pins—the great majority of which are made of low carbon steel, case hardened.

"These soft spots appear on the surface after WHEELABRATING, by reason of the grit roughing up the surface of the soft spots to a considerable greater extent than the hard portion of the pin. This rougher surface gives the appearance of being a different shade of gray; thereby making the detection of the soft spots comparatively easy with the naked eye."



At Left:
The
27" x 36"
American
WHEELA-
BRATOR
Tumbler

AMERICAN
FOUNDRY EQUIPMENT CO.

510 S. BYRKIT ST.

MISHAWAKA, IND.

**Colorado Fuel Shipments
Set Record at 432,200 Tons**

• • • Consolidated net income of Colorado Fuel & Iron Corp. for the year ended June 30 was \$2,288,318, after all charges, as compared with \$1,744,869 in the 12 months ended June 30, 1940. Earnings in the year ended June 30, 1941, were equal to \$4.06 a share on outstanding capital stock.

against \$3.10 a share in the preceding 12 month period. Net sales and operating revenues were \$39,241,034, against \$31,864,811 the year before.

Shipments of 432,200 net tons of steel other than railroad steel exceeded by 123,722 tons the preceding year's high record volume. Sales of coal, coke and coke plant by-products amounted to \$3,544,925 for the year.

Is your Finishing Department

★ PREPARED

to meet the changing conditions?

UNDER the present national emergency and defense effort many plants are confronted overnight with new finishing problems.

An entirely different production cycle may be demanded of your present equipment.

There is a Wyandotte product for any metal cleaning problem and for use in any equipment.

With a full line of metal cleaning compounds and long years of experience in tackling new problems, your Wyandotte Service Representative is the man to call when things get hot. He is as near as your telephone. Call him today.



THE J. B. FORD SALES COMPANY

• WYANDOTTE, MICHIGAN

**Export Control Put
Under Wallace; New
Job Given Stettinius**

Washington

• • • President Roosevelt last week transferred the Office of Export Control to the Economic Defense Board headed by Vice President Henry A. Wallace and at the same time delegated to Lend-Lease Administrator Edward R. Stettinius, Jr., broader powers under the lend-lease program.

The Economic Defense Board, set up by Mr. Roosevelt on July 30 to "strengthen international economic relations in the interest of national defense," also has been designated by the White House to develop overall estimates of materials and commodities required for export purposes, exclusive of lend-lease operations, and to advise SPAB of such estimated requirements.

Under the broader powers conferred on Mr. Stettinius, greater speed in the transfer of war supplies to Great Britain is expected by the President. Allocations above \$300,000,000 will continue to be handled by Mr. Roosevelt.

Mr. Stettinius now leaves the ranks of dollar-a-year men, and henceforth will receive \$10,000 a year as lend-lease administrator.

**First Steel Poured from
New Harvester Furnace**

Chicago

• • • First steel was poured Tuesday, Sept. 16, from a new 150-ton open-hearth furnace at the Wisconsin Steel works of the International Harvester Co., finished 45 days ahead of schedule. The furnace is one of two new units which will add 160,000 tons output and increase the annual capacity of the Wisconsin Steel works to approximately 860,000 net tons of ingots. A 220-ton crane, a charging machine and a two-hole soaking pit were constructed as part of the same expansion program. The total cost was approximately \$1,500,000.

The construction job was completed in eight months from the time it was authorized by the company. The new furnaces will burn pre-heated mixed blast furnace and coke oven gas.

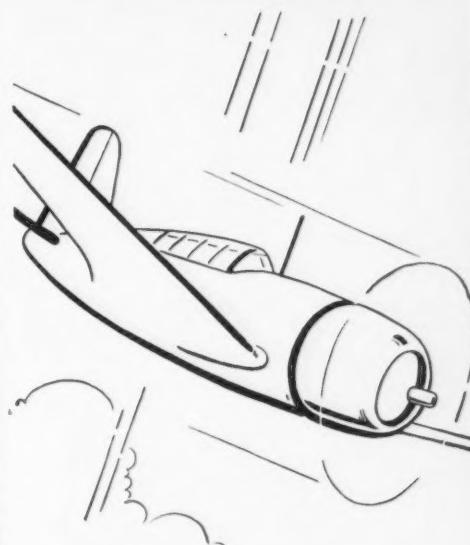
Government Awards

War Dept., Ordnance:

Alden Supply Co., Philadelphia; washers, bolts, nuts, screws, etc.		
All-Steel Equipment Co., Inc., Aurora, Ill.; stackbins		
Allegheny Ludlum Steel Corp., Dunkirk, N. Y.; tool steel		
Aluminum Co. of America, New Kensington, Pa.; magnesium		
American Brass Co., Waterbury, Conn.; gliding metal strip		
American Car & Foundry Co., Berwick, Pa.; bushings, parts & overhaul of tanks		
American Emery Wheel Works, Providence; aloxite, aluminum oxide grain		
American Fabricated Steel Co., Philadelphia; steel		
American Locomotive Co., Railway Steel Spring Div., New York; rings, forged, steel		
American Manganese Bronze Co., Philadelphia; bronze, manganese		
American Monorail Co., Cleveland; track for storehouse building		
American Optical Co., Southbridge, Mass.; machines, lens edging		
American Steel & Wire Co. of N. J., Boston, Mass.; steel		
J. Harold Andre, Davenport, Iowa; steel tubing		
Apex Tool & Cutter Co., Inc., Shelton, Conn.; cutters, misc.		
G. R. Armstrong Mfrs. Supplies, Inc., Chicago; hacksaw blades		
Armstrong Blum Mfg. Co., Chicago; hacksaw blades		
Armwall Machine Co., Jeannette, Pa.; gages		
Associated Spring Corp., Wallace Barnes Co. Div., Bristol, Conn.; springs		
Atlas Powder Co., Tamaqua, Pa.; cartridges, engine starting		
Austin-Hastings Co., Cambridge, Mass.; hack saw machines		
Autoscrew Co., New York; screws, rivets & pins		
Babcock & Wilcox Tube Co., Beaver Falls, Pa.; nickel tubing		
Baker & Co., Inc., Newark; spools, wire		
Barker Tool, Die & Gauge Co., Detroit; gages		
Bay State Abrasive Products Co., Westboro, Mass.; wheels, grinding		
Behnrich Corp., Boston; ovens		
Bendix Aviation Corp., Bendix Products Div., South Bend, Ind.; parts, misc., jets, pistons, plugs, seats & valves		
Bendix Aviation Corp., Eclipse Aviation Div., Bendix, N. Y.; engine parts		
Bendix Aviation Corp., Scintilla Magneto Div., Sidney, N. Y.; parts for magneto		
parts for tanks		
Bethlehem Steel Co., Bethlehem, Pa.; alloy steel forgings		
Bliss & Laughlin, Inc., Buffalo; steel bar		
steel		
Boston Pipe & Fittings Co., Cambridge, Mass.; ells & tees, copper streamline		
Brass & Copper Sales Co., St. Louis; brass		
Breeze Corps., Inc., Newark; parts for tanks		
Bridgeport Brass Co., Bridgeport, Conn.; cartridge cases		
81,458	Bristol Brass Co., Bristol, Conn.; cartridge brass	
	cartridge brass	
	brass rod	
2,070	Bristol & Martin, Inc., New York; gages	
	gage	
3,843	Brown & Sharpe Mfg. Co., Providence; grinding machines	
	milling machines	
1,295	Budd Wheel Co., Detroit; wheels	
	Candler-Hill Corp., Detroit; rotors, fuel pump; & housing, fuel	
10,040	1,360	pump
	parts for fuel pumps	
14,050	120,500	Canedy-Otto Mfg. Co., Chicago Heights, Ill.; bench drills
7,125	55,154	Carnegie-Illinois Steel Corp., Chicago; steel
2,140	2,515	Carpenter Steel Co., Reading, Pa.; tool steel
57,997	719,325	Chase Brass & Copper Co., Inc., Waterbury, Conn.; bronze, manganese & brass
7,400	18,132	brass strip
1,083	1,199	copper tubing
10,639	Cincinnati Milling Machine Co., Inc., Cincinnati; grinding machines	
1,129	22,578	
1,502		
3,196		
4,976		
1,160		
1,011		
23,750		
25,865		
2,114		
93,627		
2,500		
2,404		
2,256		
1,340		
1,159		
1,107		
4,668		
2,571		
26,478		
67,764		
13,775		
1,729		
3,805		
1,430		
2,227		

pump	1,328
parts for fuel pumps	6,186
Canedy-Otto Mfg. Co., Chicago Heights, Ill.; bench drills	3,404
Carnegie-Illinois Steel Corp., Chicago; steel	8,713
Carpenter Steel Co., Reading, Pa.; tool steel	6,489
steel	136,569
Chase Brass & Copper Co., Inc., Waterbury, Conn.; bronze, manganese & brass	2,349
brass strip	56,462
copper tubing	3,143
Cincinnati Milling Machine Co., Inc., Cincinnati; grinding machines	22,578

IT STOPS FIRE IN THE SKIES!



When flames spurt from the engine of a crippled warplane, lives of the crew often hang in the balance while a fire wall stands guard. Most of these lifeguards are made of metal and must be able to withstand terrifically high temperatures.

This is why many designers rely on heat-resisting ARMCO Stainless Steels for fire walls in the new super-powered warcraft. In exhaust collector systems on aircraft motors as well, engineers know from experience that these rustless metals resist the attack of white-hot corrosive gases.

In the shop ARMCO Stainless Steels do many jobs well. They are easily fabricated and need no heat treatment to develop physical prop-

erties. Spot-welding goes fast and economically.

As you know, more and more stainless steel is going to America's armament program. Should it be necessary for your products to give the green light to implements of defense, it will pay you to keep abreast of new developments in ARMCO Stainless Steels during the emergency. Just write to The American Rolling Mill Company, 2661 Curtis Street, Middletown, Ohio. District Offices in all Key Cities.

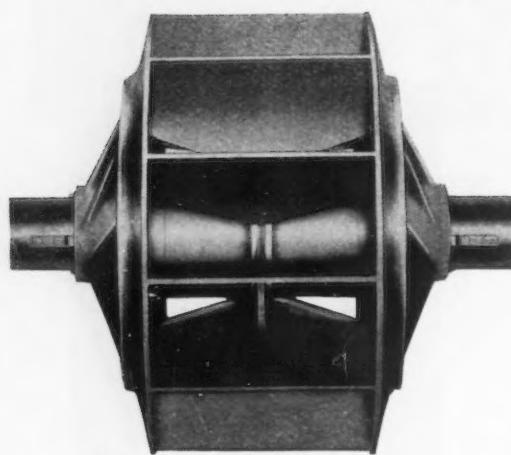


ARMCO
STAINLESS STEELS

GOVERNMENT AWARDS

Clarage Fan Co., Kalamazoo, Mich.; fans, supply & exhaust.	2,560	Colonial Steel Co., Monaca, Pa.; steel, tool	1,470
W. E. Clark Co., Boston; steel.	1,127	Colt's Patent Fire Arms Mfg. Co., Hartford; parts for guns	2,510
Clark Equipment Co., Clark Truck- tractor Div., Battle Creek, Mich.; trucktractors	2,101	Columbus Bolt Works Co., Colum- bus, Ohio; steel	12,787
Cleveland Twist Drill Co., Cleve- land; combinations, drill & counterbore	1,440	H. D. Conkey & Co., Conco Engi- neering Works Div., Mendota, Ill.; hoists	5,682
Cochrane Corp., Philadelphia; heat- er, feed water; & valve, copes reducing	1,376	Construction Machinery Co., Waterloo, Iowa; concrete mixer	1,090
Frederick Colman & Sons, Inc., Detroit; machines	28,410	Continental Motors Corp., Muske- gon, Mich.; control boxes	61,963

NO BOLTS, RIVETS OR WELDS IN THIS FAN WHEEL



The design of MICHIANA Fan wheels or impellers insures against distortions—provide for longer life. Parts are free to seek relief and any part or parts may be replaced without damage or alteration to the rest of the wheel.

MICHIANA Fans show 15 to 17 per cent greater efficiency than conventional fans under similar conditions because MICHIANA side plate design which is in the form of a wheel with spokes set at an angle of approximately 45°, prevents gas volume slippage as high temperatures are reached and gases become lighter.

MICHIANA Fans withstand the frequent variations in temperature changes, insure steady production, fewer delays and lower overall cost . . . Bulletin 638 will be mailed on request. MICHIANA PRODUCTS CORPORATION, Michigan City, Indiana.

MICHIANA HIGH TEMPERATURE FANS



ALL PARTS ARE FREE
TO SEEK RELIEF
UNDER TEMPERATURE
CHANGES

* * *

NO STRAINS ARE
EXERTED FROM
ONE PART TO OTHERS

* * *

NO DISTORTION—
NO UNBALANCING

* * *

THEREFORE,
NO COSTLY
SHUTDOWNS AND
MAINTENANCE
TROUBLES

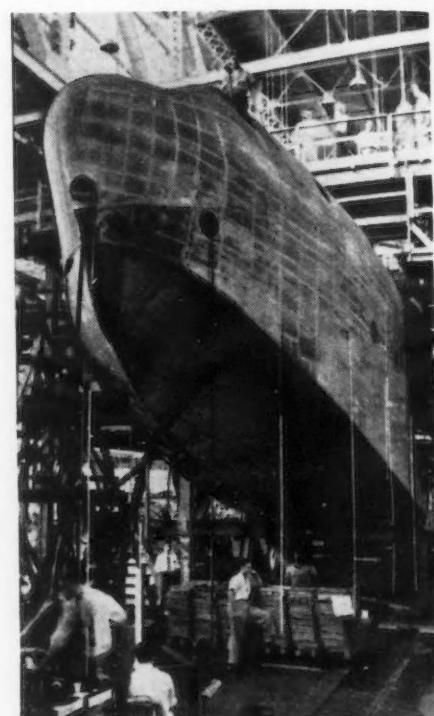


Photo by International

AERIAL BATTLESHIP: The Navy's answer to the Army's B-19 is the 70-ton flying boat (above) which is nearing completion at the Middle River plant of the Glenn L. Martin Co. in Baltimore. The craft, largest flying boat in the world, weighs 140,000 lb. and has a wingspread of 200 ft. It is powered by four 2000-hp. engines and is capable of flying far into the interior of Europe and back again without refueling. The hull is designed to carry power-operated gun turrets, emplacements and blisters that will protect the great craft from every possible angle of attack.

Continental Screw Co., New Bedford, Mass.; parts for guns	2,089
Cortland Grinding Wheels Corp., Chester, Mass.; grinding wheels	1,995
County Supply Co., Plainfield, N. J.; wrenches	1,494
Crane Co., Davenport, Iowa; pipe & tees, reducers, flanges, etc.	1,028
Crescent Insulated Wire & Cable Co., Trenton, N. J.; steel	1,740
Crucible Steel Co. of America, Midland, Pa.; steel bar, nickel; & steel bar, carbon	1,513
Cuno Engineering Corp., Meriden, Conn.; filters, gas	1,535
Cutler-Hammer, Inc., Boston; magnets	1,881
B. H. Deacon Co., Inc., Philadelphia; pipes, black steel & wrought iron	5,541
Denman & Davis, North Bergen, N. J.; steel bar	1,188
Derbyshire Machine & Tool Co., Philadelphia; dies	9,450

GOVERNMENT AWARDS

Detroit Seamless Steel Tubes Co., Detroit; boiler tubes	1,227	Interstate Mechanical Laboratories, Inc., New York; gages	1,184	Kilgore Mfg. Co., International Flare-Signal Div., Tipp City, Ohio; pistols, pyrotechnic	600,472
Detroit Steel Tube Co., Detroit; steel tubing	2,398	Iowa Supply Co., Ottumwa, Iowa: radiators	14,882	Kincaid Co., Inc., New York: parts for guns	61,351
Detroit Tap & Tool Co., Detroit; gages	13,280	J. C. H. Automatic Machine Works, Philadelphia; parts for cartridge cases	2,859	H. R. Krueger & Co., Detroit: drilling machines	6,265
Drive-All Mfg. Co., Detroit; drive units	39,837	B. Jahn Mfg. Co., New Britain, Conn.; dies	2,053	Landis Machine Co., Waynesboro, Pa.; threading machines	1,227
R. D. Eaglesfield, Indianapolis; shells	104,000	Jones & Lamson Machine Co., Springfield, Vt.; parts for lathes projectors	2,509	A. B. Landis' Sons, Inc., Wynd- moor, Pa.; parts for cartridge cases	2,275
Edgewater Steel Co., Verona, Pa.: rolled rings	1,280	John P. Kelly, Philadelphia: cast- ings	2,692	La Salle Steel Co., Hammond, Ind.; steel	4,328
Electric Wheel Co., Quincy, Ill.: trailers	14,296	Kent Aircraft & Machine Tool Co., Camden, N. J.; gages	3,918	Liberty Tool & Die Corp., Roches- ter, N. Y.; gun parts	1,378
Exact Weight Scale Co., Colum- bus, Ohio; receptacles, brass weights, cups & platters	3,351				
Federal Machinery Sales Co., Chi- cago; heads, gages & chasers	15,452				
Federal Tool Corp., Chicago; gages	1,214				
Ferry Machine Co., Kent, Ohio: tools	2,040				
William H. Field Co., Boston; table, saw, double	1,036				
A. Finkl & Sons Co., Chicago; alloy steel forgings	1,525				
Firth-Sterling Steel Co., McKees- port, Pa.; tool steel	3,250				
Fosdick Machine Tool Co., Cincin- nati; radial drills	41,075				
Fram Corp., East Providence; tubes & tees	27,636				
Russell R. Fray, Glendale, Cal.: attachments, milling; & heads, boring	20,750				
Gates Rubber Co., Denver, Colo.: generator drive belts	1,438				
General Electric Co., Boston; elec-	24,625				
General Machinery Corp., Niles Tool Works Div., Hamilton, Ohio; parts for lathes	2,360				
General Motors Corp., AC Spark Plug Div., Flint, Mich.; instru-	1,479				
General Motors Corp., Chevrolet Motors Div., Detroit; trucks	12,485				
General Motors Sales Corp., Hyatt Bearings Div., Harrison, N. J.:	5,427				
Giddings & Lewis Machine Tool Co., Fond du Lac, Wis.; ma-	160,472				
Gilbert & Barker Mfg. Co., Spring- field, Mass.; tanks for fuel oil	1,140				
Good Roads Machinery Co. of N. Y., Inc., Albany, N. Y.; snow removers for garage	123,374				
Grainger-Rush Co., Bethlehem, Pa.: breakers, air circuit	1,956				
Graybar Electric Co., Boston: clamps, conduit, malleable iron.	7,395				
Great Lakes Steel Corp., Detroit; steel	2,165				
Greenfield Tap & Die Corp., Green- field, Mass.; gages	1,947				
Edward Groh Metal Products, Philadelphia; screen guards on fire escapes, windows & doors ..	3,566				
Guberson Diesel Engine Co., Chi- cago; parts for tanks	16,821				
Holger Hansen, Lynn, Mass.: gages	1,271				
Louis Hanssen's Sons, Davenport, Iowa; pliers	19,183				
George K. Heebner, Inc., Phila- delphia; installation of founda-	1,627				
Hughes Keenan Co., Mansfield, Ohio; tractor type crane	2,094				
Illinois Tool Works, Chicago; cutters	5,785				
Industrial Engineering Equipment Co., Davenport, Iowa; driving unit	6,957				
Industrial Tool & Die Works, Inc., St. Paul; gages	1,174				
Ingersoll-Rand Co., New York; air compressors	1,098				
	3,991				
	1,435				

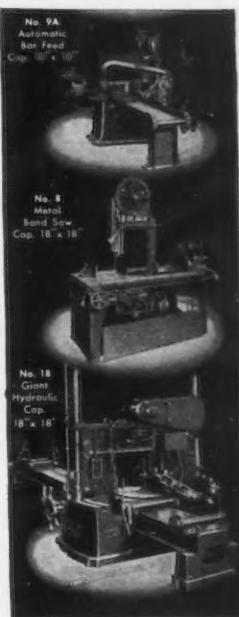
A COMPLETE SYSTEM OF METAL SAWING

The MARVEL System of Metal Sawing provides exactly suited saws for every shop or department. Included in the System are: Low priced dry-cutting general purpose shop saws; a light duty high speed shop saw; heavy duty, all-ball-bearing speed saws (the fastest saws built); heavy duty production saws with automatic bar push-up; versatile all-purpose metal cutting band saws of large capacity; a new giant hydraulic hack saw designed for the largest sizes and toughest alloys . . . and the positively unbreakable MARVEL High-Speed-Edge Hack Saw Blades.

ARMSTRONG-BLUM MFG. CO.

"The Hack Saw People"

5700 Bloomingdale Ave., Chicago, U. S. A.
Eastern Sales: 225 Lafayette St., New York City



In almost every leading tool manufacturing plant, as in the Chicago plant illustrated here, they have standardized on MARVEL Metal Sawing Equipment. (Above: MARVEL No. 8 Metal Cutting Band Saws. Below, a battery of MARVEL No. 6A High Speed Production Saws.)

MARVEL SAWS

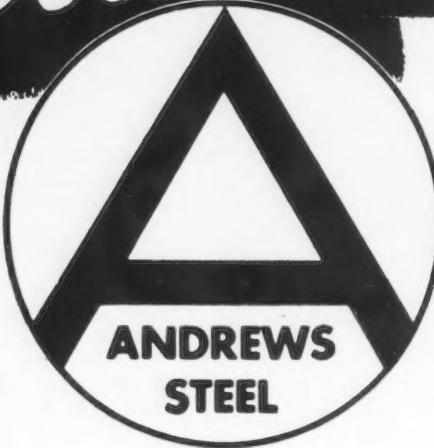
ARMSTRONG-BLUM MFG. CO. "The Hack Saw People"
5700 Bloomingdale Ave., Chicago, U. S. A. Eastern Sales: 225 Lafayette St., N. Y.

GOVERNMENT AWARDS

Lincoln Electric Co., Moline, Ill.; welding head, carbon arc; assembly, headable & motor generator	2,690	Manning, Maxwell & Moore, Inc., Bridgeport, Conn.; gun parts	3,963
Lincoln Park Tool & Gage Co., Lincoln Park, Mich.; gages	5,613	May Co., Moline, Ill.; vacuum pumps	1,283
Lindsley Mfg. Co., Milford, Conn.; gages	16,550	McCord Radiator & Mfg. Co., Detroit; helmets	776,122
Lorain Machine Tool Co., Cleveland; gun parts	1,460	Mechanical Laboratories, Inc., Pittsburgh; inspection gages	1,230
Lyon Metal Products, Inc., Aurora, Ill.; steel	10,119	Mesta Machine Co., West Homestead, Pa.; forgings, alloy steel boring mills	11,731
Machinery Builders, Inc., Long Island City, N. Y.; machines, jumble testing	12,365	Midvale Co., Philadelphia; tubes, steel	323,600
Magnaflex Corp., Chicago; inspection machines	6,849	Midwestern Tool Co., Chicago; gages	864,090
		Minneapolis Moline Power Implement Co., Minneapolis; shells	1,105
			32,629
			2,335,755

IRON and STEEL PRODUCTS

THE Andrews Steel trade-mark is indisputable proof of high quality and ability to deliver extra performance under all conditions. But, more than that . . . this famous trade-mark safeguards your good name because Andrews quality is transmitted to every product of which iron and steel become a part. Your inquiries will be welcomed.



*Andrews Products in Carbon and Alloy Steel: Bars • Plates • Universal Mill Plates
Sheet Bars • Billets • Blooms • Slabs.*



Modern Tool & Die Co., Philadelphia; gages	3,625
Mohawk Machine & Tool Co., New York; gages	8,320
Monarch Machine Tool Co., Sidney, Ohio; lathes	28,778
Mullins Manufacturing Co., Salem, Ohio; shells	697,493
Murray Co., Atlanta; lathes	158,502
National Forge & Ordnance Co., Irvine, Warre Co., Pa.; forgings, alloy steel	4,904
National Machinery Co., Chicago; forging machines	63,506
National Twist Drill & Tool Co., Detroit; twist drills	2,338
New Britain Machine Co., New Britain, Conn.; bench legs	3,760
New Monarch Machine & Stamping Co., Des Moines, Iowa; clips, straps and assemblies	1,696
Niles-Bement-Pond Co., Pratt & Whitney Div., West Hartford; lathes, shapers & millers	53,034
gages	13,368
hand taps	2,405
Norton Co., Worcester; grinding wheels	3,106
Ohio Steel Foundry Co., Lima, Ohio; steel	698,625
Oilgear Co., Milwaukee; parts for pump	1,604
Oliver Farm Equipment Co., Chicago; shells	2,832,732
Otis Elevator Co., Buffalo; steel castings	8,875
Package Machinery Co., Springfield, Mass.; machines, clip-filling	5,000
Pawling Refining Corp., Port Chester, N. Y.; tubes, grease	14,158
Peco Manufacturing Corp., Philadelphia; lifting plugs	48,422
Peirce-Tredinich Co., Inc., Newark; valves, nipples, flanges, joints, etc.	4,870
Pennsylvania Forge Corp., Philadelphia; forgings, breech block	26,500
Peoria Tractor & Equipment Co. Rep.: Caterpillar Tractor Co., Peoria, Ill.; gauges	1,823
Pike Trailer Co., Los Angeles; trailers	1,980
Pittsburgh Steel Foundry Corp., Glassport, Pa.; steel castings	35,924
Plume & Atwood Mfg. Co., Thomaston, Conn.; gilding metal strip brass strip	5,579
Poor & Co., Canton Forge & Axle Works, Canton, Ohio; forgings	23,902
Precise Tool & Mfg. Co., Farmington, Mich.; gages	28,412
Quality Hardware & Machine Corp., Chicago; motor drives	15,100
Quality Tool & Die Co., Indianapolis; gages	3,275
A. B. & J. Rathbone, Palmer, Mass.; steel	3,080
Reasoner Tool & Supply Co., Detroit; saws & blades	7,489
Reliable Tool Co., Inc., Irvington, N. J.; locators, punches, drills	6,892
Republic Steel Corp., Cleveland; steel bars	2,760
steel	1,575
Revere Copper & Brass, Inc., Chicago; brass & bronze	5,105
Rheem Manufacturing Co., New Orleans; shells	2,367
Sampsel Time Control, Inc., Spring Valley, Ill.; parts for tanks	1,034,250
Sandberg Equipment Co., Chicago; "Mules," International Shop; & tractors	1,932
Sears Saddlery Co., Davenport, Iowa; charges, propelling	5,049
Sharon Steel Corp., Sharon, Pa.; steel	3,519
Sieg Co., Davenport, Iowa; grinders	2,849
Sowers Mfg. Co., Buffalo; mixing kettles	1,146
	98,551

GOVERNMENT AWARDS



Photo by British-Combine

SOVIET TORPEDO: A Russian navy sailor is preparing a new torpedo after a successful raid, according to a caption approved by the British censor.

U. S. Pipe & Foundry Co., Birmingham, Ala.; shells	694,572	M. J. Walsh & Sons, Holyoke, Mass.; rental of crane with boom & bucket	1,773
U. S. Tool & Mfg. Co., Dearborn, Mich.; steel cutters	5,663	Walworth Co., Boston; seamless brass	1,068
Van Norman Machine Tool Co., Springfield, Mass.; parts for milling machine	1,379	Frank M. Weaver & Co., Inc., Lansdale, Pa.; structural steel.	1,457
Vineo Corporation, Detroit; gages plates	64,591 6,190	Weaver Mfg. Co., Springfield, Ill.; trucks	15,854
R. Wallace & Sons Mfg. Co., Wallingford, Conn.; cartridge clips	980,400	S. K. Wellman Co., Cleveland; clutch facings & steel rivets	45,638
Wallace Supplies Mfg. Co., Chicago; assemblies	7,365	Westinghouse Electric Supply Co., Wetmore-Savage Div., Boston; conduit, rigid steel	1,207
Ward LaFrance Truck Corp., Elmira, N. Y.; breaker assemblies parts	1,244	J. H. Williams & Co., Buffalo; forgings	10,927



An assist! By ATLAS

View at Prominent Iron Foundry

To Lower Costs!

Here Atlas - designed, Atlas - built equipment moves heavy scrap and other charging materials with consummate ease.

Monorail deposits empty bucket on roller conveyor. Bucket rolls down to scale platform, is charged with iron, weight read from yard crane cab. Scale platform lowers, turns, bucket rolls down to monorail for pick-up and charge to cupola.

A propitious circle, presaging profit at the year-end—and a definitely typical Atlas installation.

THE ATLAS CAR & MFG. CO.

Engineers

CLEVELAND, OHIO

Manufacturers

serving the world with mobile handling equipment

GOVERNMENT AWARDS

Worthington Pump & Machinery Corp., Harrison, N. J.; parts, repair, for hydraulic high pressure pump 4,923
Wright Aeronautical Corp., Paterson, N. J.; flywheel hubs 1,584
Zimmerman Steel Co., Bettendorf, Iowa; steel castings 1,595

War Dept., Air Corps:

Ainsworth Mfg. Corp., Detroit; bomb shackle assemblies \$197,673
Bendix Aviation Corp., Bendix Products Div., South Bend, Ind.; struts, lock rings, brake assemblies & wheel assemblies 79,783
Brewster Aeronautical Corp., Long Island, N. Y.; gas tanks 163,136
Cambridge Instrument Co., New York; mixture indicators 110,200
Cedar Rapids Engineering Co. of Delaware, Cedar Rapids, Iowa; handles, socket wrench, torque indicating handles 104,266
Cincinnati Electrical Tool Co., Cincinnati; buffers, polishers, & grinders 36,699
James Clark, Jr., Electric Co., Louisville, Ky.; grinders, pedestal type 28,600
Curtiss-Wright Corp., Curtiss Propeller Div., Caldwell, N. J.; propeller assemblies 156,032
Dumore Co., Racine, Wis.; buffers & polishers 2,962
General Electric Co., Schenectady; lamp assemblies, floodlight portable 195,720
General Electric Co., Dayton, Ohio; inverter assemblies 77,050
Irving Air Chute Co., Inc., Buffalo; gunner safety belts 64,999

Jacobs Aircraft Engine Co., Pottstown, Pa.; crankcase assemblies 99,867

Machinery & Specialties, Inc., Dayton, Ohio; grinders & buffers 14,264
Mall Tool Co., Chicago; grinders, flexible shaft 9,730
Glenn L. Martin Co., Baltimore; gun turrets 123,071
Okonite Co., Hazard Insulated Wire Works Div., Chicago; cable 115,045
Siefreat - Elstad Machinery Co., Dayton, Ohio; grinders, drill bench type 21,388
Standard Electrical Tool Co., Cincinnati; grinders, bench type, wet wheel 1,434
U. S. Electrical Tool Co., Cincinnati; buffers, polishers, grinders, etc. 88,241

War Dept.; Corps of Engineers:

Alabama Machinery & Supply Co., Dothan, Ala.; fence, barbed wire, posts, gates, Advanced Single Engine Flying School, Grimes, Ala. \$7,540
Addressograph - Multigraph Corp., Cleveland; zinc 970
Armo International Corp., Middletown, Ohio; culvert pipe 68,957
Asco Supply Co., Inc., Glendale, L. I., N. Y.; boilers & plumbing supplies, Mitchel Field, L. I., N. Y. 2,466
Barber-Greene Co., Aurora, Ill.; bucket loader & flight conveyor, Westover Field, Chicopee Falls, Mass. 3,527
Barco Manufacturing Co., Chicago; ditchers 18,810

hammers, gasoline, portable, with accessories and spare parts 6,861
Belmont Iron Works., Royersford, Pa.; structural steel, DeRidder, La., Airport 34,500

Buda Co., Harvey, Ill.; earth auger 4,506
Buffalo - Springfield Roller Co., Washington; rollers 37,625

R. D. Cole Mfg. Co., Newman, Ga.; steel water tank, Valdosta, Ga., Airport 25,785

Richard S.丹佛斯, Berkeley, Cal.; utility anchors 5,040

Donaldson Iron Co., Emmaus, Pa.; castiron water pipe, Middletown Air Depot, Middletown, Pa. 19,926

Edwards Co., New York; railroad cars 125,000

Galion Iron Works & Mfg. Co., Galion, Ohio; road grader 107,271

General Electric Supply Corp., Washington, D. C.; electrical equipment 2,919

General Motors Corp., Detroit; station wagons & pick-up trucks 37,018

General Motors Sales Corp., LaGrange, Ill.; diesel engines, generators & auxiliary equipment, Fairfax Industrial District, Kansas City, Kan. 171,351

Good Roads Machinery Corp., Kennett Square, Pa.; spreaders, aggregate 2,465

Harnischfeger Corp., Milwaukee; diesel-powered shovels & replacements 163,037

C. R. Jahn Co., Washington; semi-trailers & dollies 11,244

Joyce-Cridland Co., Dayton, Ohio; jack, speed base, traversing 2,404

R. K. LeBlond Machine Tool Co., Cincinnati; lathes 2,603

R. G. LeTourneau, Inc., Peoria, Ill.; welder, tournacar 10,686

Mercury Manufacturing Co., Chicago; trucks, platform, trailer. 3,790

Moore-Hawley Hardware Co., Birmingham, Ala.; electric welded pipe, Aviation Mechanics' Training School, Biloxi, Miss. 44,214

Railway Accessories Co., Cincinnati; used tank cars 9,800

Ransome Concrete Machinery Co., Dunellen, N. J.; mixers, concrete, portable 25,092

Republic Steel Corp., Cleveland; reinforcing bars & nuts 10,744

Rogers Brothers Corp., Albion, Pa.; trailers 34,610

Standard Gas Equipment Corp., New York; ranges, bake ovens & fryers, Biloxi, Miss., Training School 8,303

Sullivan Machinery Co., New York; air compressors 3,612

Taylor Iron Works & Supply Co., Macon, Ga.; steel water tanks, Moultrie, Ga., & Sebring, Fla., Airports 47,400

Truscon Steel Co., Youngstown, Ohio; sidewalls, Aircraft Assembly Plant, Tulsa 241,798

roof decking, Aircraft Assembly Plant, Tulsa 457,617

doors, Aircraft Assembly Plant, Tulsa 344,029

Twin Disc Clutch Co., Racine, Wis.; repair parts for clutch 2,693

Union Pacific Railroad Co., Omaha, Neb.; permanent spur tracks, Aircraft Assembly Plant, Kansas City, Kan. 16,227

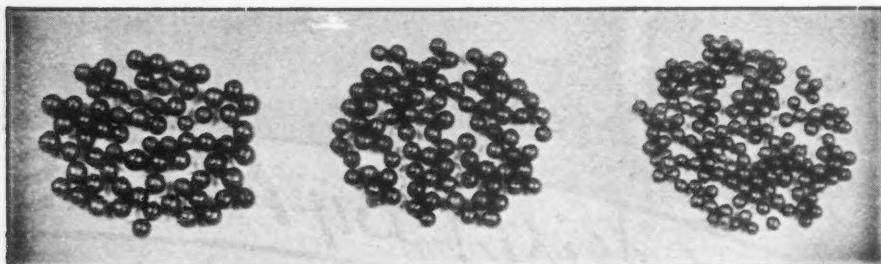
United States Steel Export Co., Washington; steel & wire 2,265

Wallace & Tiernan Co., Inc., Belleville, N. J.; purification units 14,002

Yale & Towne Mfg. Co., Philadelphia; crane, truck, fork 13,187

War Dept., Signal Corps:

American Automatic Electric Sales Co., Chicago; cable, switchboard \$3,708



HEAT-TREATED STEEL SHOT

We manufacture shot and grit for endurance

A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

The unprecedented demand for our—

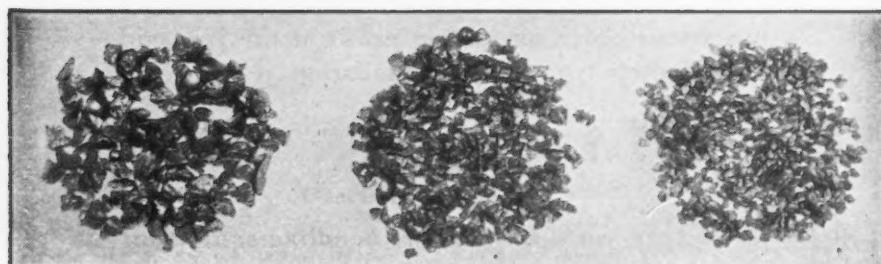
Heat-Treated Steel Shot and Heat-Treated Steel Grit

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.

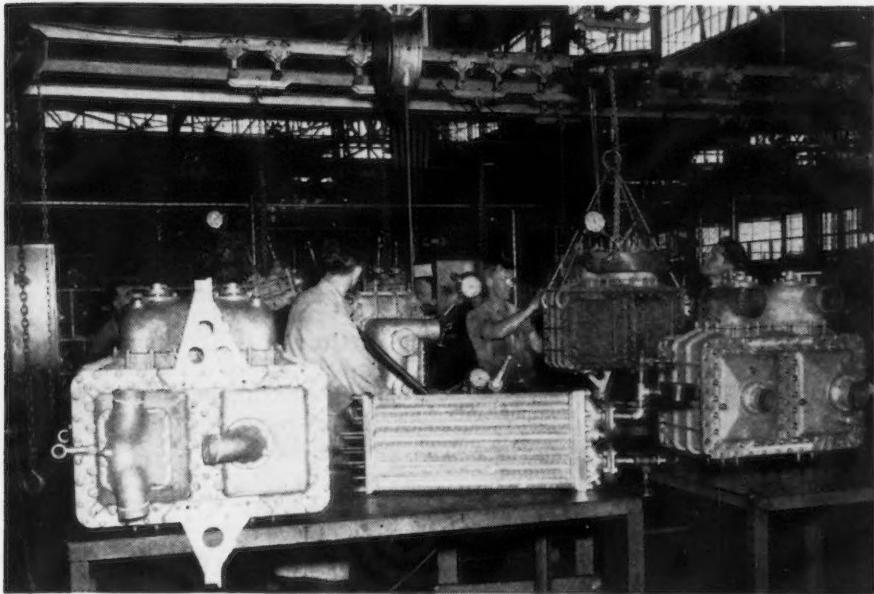
HARRISON ABRASIVE CORPORATION

MANCHESTER, NEW HAMPSHIRE

HEAT-TREATED STEEL GRIT



GOVERNMENT AWARDS



COOLERS FOR MOSQUITO BOATS: The oil and water coolers shown above are being manufactured and delivered to the Navy by General Motors Harrison Radiator Division at Lockport, N. Y. The coolers are for installation in "mosquito boats" of the U. S. Navy.

Bartlett Mfg. Co., Detroit; trimmers	1,480
Brunswick - Balke - Collender Co., Chicago; chests	9,924
Allen D. Cardwell Mfg. Corp., Brooklyn; jacks, binding posts, terminals, cases, telegraph sets, etc.	
Communication Products Co., Jersey City; cable	52,529
Conco Engineering Works Div., H. D. Conkey & Co., Mendota, Ill.; reels	7,546
Copperweld Steel Co., Glassport, Pa.; wire	86,995
Federal Stamping & Engineering Corp., Brooklyn; connector clamps	1,874
Froiland Manufacturing Co., Springfield, Mass.; couplings	3,150
Graybar Electric Co., Inc., Chicago; wire	1,850
Harrisburg Steel Corp., New York; cylinders, gas	
Harvard Lock Co. of New York, Inc., New York; weights	1,526
Homelite Corp., Port Chester, N. Y.; power units	9,340
Insuline Corp. of America, Long Island City, N. Y.; alignment tools	8,342
Joslyn Co., New York; rings	38,208
Kellogg Switchboard & Supply Co., Chicago; cable	
Peter A. Petroff, New York; castings, nuts, shafts, tags, sleeves & keys	452
Radio Receptor Co., Inc., New York; keyers & relays	1,250
John A. Roehlings Sons & Co., New York; wire	10,538
Rome Cable Corp., Rome, N. Y.; wire	2,468
Henry H. Sheip Mfg. Co., Philadelphia; chests	2,327
Silcock's Miller Co., South Orange, N. J.; scales	2,522
Simplex Wire & Cable Co., Cambridge, Mass.; wire	885
Small Motors, Inc., Chicago; coils	391
Templeton Kenly & Co., Chicago; jacks	1,718
A. J. Ulmer, New York; cases & terminals	1,470
Utica Drop Forge & Tool Corp., Utica, N. Y.; pliers	2,140

Warren Foundry & Pipe Corp., New York; manhole tops	7,425
Widin Metal Goods Co., Garwood, N. J.; axles	1,530
War Dept., Medical:	
Cleveland Dental Mfg. Co., Cleveland; tooth forceps	\$720
Fearless Dishwasher Co., Rochester, N. Y.; double & single tanks	1,980
General Electric X-Ray Corp., Chicago; x-ray equipment	128,783
International Silver Co., Meriden, Conn.; forceps	32,500
Taylor Metal Products Co., Mansfield, Ohio; dish carts	22,473
War Dept., Quartermaster Corps:	
Enterprise Tool & Metal Works, Chicago; ranges, field, accessories, equipment & spare parts	\$20,653
Osgood Company, Marion, Ohio; crawler cranes & spare parts	29,760
Defense Plant Building:	
E. I. du Pont de Nemours & Co., Wilmington, Del.; construction, acquisition and installation of equipment, and operation of Oklahoma Ordnance Works, Choctaw, Okla.	\$45,982,478
Eaton Mfg. Co., Cleveland; additional machinery and equipment for manufacture of aircraft valves	173,950
additional machinery and equipment for manufacture of aircraft engine parts	116,583
Fairchild Engine & Airplane Corp., Hagerstown, Md.; additional plant facilities	1,675,967
General Motors Corp., Hyatt Bearings Division, Harrison, N. J.; additional equipment for manufacturing aircraft engine bearings	567,000
A. O. Smith Corp., Milwaukee; additional machinery and equipment for manufacture of landing and tail gear assemblies for aircraft	505,301

20% MORE SCRAP NEEDED, Says OPM

● The Office of Production Management has inaugurated a campaign to increase the flow of iron and steel scrap to steel mills and foundries.

● OPM estimates that the supply of iron and steel scrap must be increased as much as 20% to keep the iron and steel industry operating at maximum capacity.

● An official of the OPM has been quoted as saying:

"This country is absolutely dependent on scrap dealers for collection of this scrap to maintain the present rate of manufacture of iron and steel."

● The Charles Dreifus Company, specialist in iron and steel scrap for 40 years, is anxious to do its part to prevent any bogging down of the National Defense Program through lack of sufficient steel.

● We urge all steel users and scrap dealers to cooperate with OPM and with the iron and steel industry in rushing scrap to market as fast as possible.

● Inquiries regarding the disposal of scrap will be given immediate attention. Write or telephone:

**The
CHARLES
DREIFUS
Company**

Philadelphia Widener Bldg. Rittenhouse 7750	Pittsburgh Oliver Bldg. Atlantic 1856
Worcester, Mass. Park Bldg. Worcester 6-2535	

PERSONALS

• **Otto W. Winter** has been named vice-president in charge of manufacturing of the Republic Drill & Tool Co., Chicago, newly organized manufacturers of high speed twist drills. He has also been elected a member of the board of directors of the Republic company. For the past four years, Mr. Winter has served as factory manager of the Columbus McKinnon Chain Corp. and its subsidiary, Chisholm Moore Hoist Corp., Tonawanda, N. Y. Previous positions he has held include the Kent-Owens Machine Co., Toledo, Ohio, as industrial engineer; Whitman & Barnes, Inc., Detroit, as general manager of the cutter division; Cincinnati Milling Machine & Cincinnati Grinders, Inc., as sales engineer and a period in the U.S.S.R. as a consultant to the Soviet machine tool and cutting tool industries.

• **E. L. Solomon** of Pittsburgh was appointed a member of a defense advisory committee of the waste material industry in Washington. This committee comprises 18 members, representing the six divisions of the industry, and will function as a working organization. Its advice will be used as the basis for government agency decisions affecting the industry.

• **Dr. Theodore von Karman** has joined the engineering staff of Northrop Aircraft, Inc., as consultant on aerodynamic and structural engineering problems. For a number of years director of the Aachen, Germany, aeronautical laboratory, Dr. von Karman came to this country nearly 15 years ago and shortly thereafter became an American citizen. For the past 12 years, he has been director of the Guggenheim Aeronautical Laboratory at the California Institute of Technology.

• **Leo A. Behrendt** has joined the Crucible division of the Joseph Dixon Crucible Co., Jersey City, N. J. In 1926 he became superintendent of the Chicago Crucible Co., which four years after its merger in 1930 with the Naugatuck Valley Crucible Co. became known as the American Crucible Co. He became a director of the company in 1936, as well as vice-president and plant manager, positions he has held until his resignation.

• **George N. Harmon**, general superintendent of the sheet and tin departments of the Warren and Niles Works, has been promoted to assistant district manager of the Warren-Niles district of Republic Steel Corp. His entire business experience of over 25 years has been in the steel business, and he has been working for Republic and its subsidiaries since 1919.

• **J. J. Schriner** has severed his connections with the Globe Steel Barrel Co., Cleveland, with which he had been associated as president.



OTTO W. WINTER, vice-president
of the Republic Drill & Tool Co.,
Chicago.

• **Harley Hicks**, Buffalo representative for the Allison division of General Motors Corp., Indianapolis, has been named manager of the Buffalo district office which was opened as a contact point between Allison engineers and technicians and Buffalo airplane manufacturers. Allison liquid-cooled airplane engines are used in the Curtiss P-40 and the Bell Airacobra.

• **Arthur B. Morrill**, engineer at the city sewage disposal plant in Detroit, is one of a commission of 16 men from the United States preparing to fly to the Orient to direct medical and disease control work among a labor army of a quarter million men in the construction of a railway along the famous Burma Road. Mr. Morrill will supervise sanitation of 50 construction camps along the road as a member of the Burma-Yunnan Railway Medical Commission, tentatively scheduled to leave Nov. 25

and be gone about a year. He is a graduate of Massachusetts Institute of Technology with a degree in sanitary engineering. His previous experience includes four years of teaching at Pei Yang University in Tientsin, China. He came to Detroit in 1925 as the result of a nation-wide civil service examination to design the \$7,000,000 filtration plant of the Springwells Pumping Station for the Department of Water Supply. In 1936 he designed the Detroit sewage treatment plant.

• **Arthur P. Kroeger** has been promoted from assistant general branch manager of the Los Angeles office of the Monsanto Chemical Co., St. Louis, to assistant manager of sales in charge of intermediates, with headquarters in St. Louis.

• **Charles L. Fetzner**, who has been associated with the company since 1919 and in the San Francisco office since 1927, has been transferred to the Los Angeles office as assistant general branch manager to replace Mr. Kroeger.

Mr. Kroeger joined Monsanto in 1929 as a chemist in its rubber service department in Akron, Ohio, working part time while finishing his last two years toward a degree in chemistry from the University of Akron. In 1934 he was sent to Japan and China where he sold Monsanto rubber chemicals and did technical service work. Returning to this country in 1935, he was transferred from the rubber service department to the organic chemicals division and was sent to the company's San Francisco office. When Monsanto's Los Angeles branch was opened in 1937 he was sent to that location as assistant general branch manager.

• **R. J. Forkey** has been appointed sales engineer for Upper and Western New York State by Norton Co., Worcester, Mass. Mr. Forkey, a graduate of Worcester Polytechnic Institute, has been connected with the research laboratories and the sales engineering department at the Worcester plant.

• **Ward F. Simmons**, metallurgical engineer, has joined the technical staff of Battelle Memorial Institute, Columbus, Ohio. Prior to joining Battelle, he was associated with the American Steel & Wire Co., Duluth, Minn. Mr. Simmons was graduated from the

School of Mines and Metallurgy of the University of Minnesota.

• **J. R. Paisley** has become secretary, assistant treasurer, and a director of the Broden Construction Co., Cleveland, subsidiary of the Wean Engineering Co., Warren, Ohio. He previously had been treasurer of Culver Aircraft Corp., Wichita, Kan., and auditor of the National Fireproofing Corp. In addition, he had been secretary of the Aetna-Standard Engineering Co., for about 14 years.

• **Frank H. Miller**, formerly assistant manager of the pig iron and coke sales division of the American Rolling Mill Co., Middletown, Ohio, has joined the David J. Joseph Co., Cincinnati. He first went to work for Armco in 1919.

• **Kenneth R. Blake** has been appointed chief engineer of the Kaydon Engineering Corp., Muskegon, Mich. He has had extensive experience as consulting engineer and technical adviser with such companies as Eaton Mfg. Co., Muncie Gear Mfg. Co., and Motor State Products Co.

• **Harry G. Johnson** has been made territorial salesman for Indianapolis for Manning, Maxwell & Moore, Inc., Bridgeport, succeeding **Gerald Beebe**, who has been extended a leave of absence due to illness.

• **Robert E. Bressler** has been elected vice-president and general manager of Kol-Master Corp., Oregon, Ill., in addition to his duties as chief engineer.

• **Henry A. Strow**, who has been maintenance service engineer of the Detroit transmission division of General Motors Corp., has been made chief chemist of MacDermid, Inc., Waterbury, Conn. After his graduation from Purdue University, he was research chemist for the Udylite Corp.

• **Naaman H. Keyser** has joined the research staff at Battelle Memorial Institute, Columbus, Ohio, and has been assigned to metallurgical research.

• **Gerald B. Duff** has been appointed to represent the Drever Co. in metropolitan New York and Northeastern Pennsylvania. Mr. Duff, who has had long experience in the industrial furnace field, will have his offices at 68 Clinton Avenue, Newark.

OBITUARY...



THE LATE Robert V. Good, manager of the Philadelphia Works of the General Electric Co., Schenectady, N. Y.

• **Robert V. Good**, manager of the Philadelphia Works of the General Electric Co. since 1936, died Sept. 17, aged 50 years. Mr. Good was born in Germany in 1890, graduating in 1911 from the Royal Technical School at Stuttgart. In that year he came to the United States, obtained employment in Cincinnati. In 1913 he joined the General Electric Co. in the general superintendent's office at Schenectady. Two years later Mr. Good was assigned to efficiency work in the heavy apparatus lines, and in 1919 was appointed to make analytical studies of GE manufacturing methods. In 1928 after several supervisory appointments, he was named superintendent of the milling department, one of the largest divisions of the GE Schenectady works. In 1929, Mr. Good was transferred to the Philadelphia Works as assistant manager, and was appointed manager in 1936.

• **George J. Campbell**, founder and president of the International Chain & Mfg. Co., York, Pa., died suddenly on Sept. 9.

• **Donald G. Henderson**, chairman of the board of directors of Consolidated Steel Corp., Los Angeles, died Sept. 14 at his Hermosa Beach, Cal., home. Mr. Hender-

son, who was 51 years old, had been in poor health for several months. Joining Consolidated Steel in 1930, he was elected treasurer in 1931, vice-president and treasurer in 1934, and president in 1938. He held the latter position until last month, when he was elected chairman of the board.

• **Oran J. Brown**, aged 52 years, traffic manager of the Koehring Co., Milwaukee, died Sept. 16 after a seven weeks' illness. He had been an employee of the firm since 1922 and held his last position for 10 years.

• **Peter Stewart**, since 1939 assistant manager of operations of the American Steel & Wire plant at Worcester, died Sept. 10 in Boylston, Mass., at the age of 66. He had been with the American Steel & Wire plant at Worcester since 1900. He was born in Glasgow, Scotland.

• **Hugh A. Scallen**, 46, district manager of the New England branch and warehouse of the Jessop Steel Co., with offices at Hartford, Conn., died suddenly from a heart attack on Sept. 2 while driving his automobile. Mr. Scallen had been affiliated with the tool steel industry for 23 years.

• **Harold J. Stein**, director of research, chemistry and metallurgy in the manufacturing department at the Allis-Chalmers Mfg. Co., Milwaukee, died Sept. 9 at his home there at the age of 47 years. He went to work for Allis-Chalmers as a student apprentice in 1916 and was promoted to his present position when the three departments were consolidated three years ago on the retirement of R. S. MacPherran, chief chemist.

• **James C. Lenahan**, 49, purchasing agent of the Link Belt Co., Philadelphia, died Sept. 7, at the Shore Memorial Hospital where he was taken after he collapsed on the beach at Ocean City, N. J. Mr. Lenahan had been an employee of the Link Belt Co., for 36 years, starting with the company when he was 13 years old.

• **Dr. Heinrich Koppers**, famous engineer in the development of by-product coke industries, died suddenly on Sept. 5, at his home in Germany. He was 69 years old.

CONSTRUCTION STEEL

... STRUCTURAL STEEL, REINFORCING BARS, PLATES, PILING, ETC.

Fabricated Steel

Awards jump to 32,900 tons from 15,600 tons last week; new projects lower at 20,600 tons against 27,250 tons; plate awards total 5825 tons.

AWARDS

NORTH ATLANTIC STATES

2286 Tons, Philadelphia, lift bridge for Navy Yard, to Phoenix Bridge Co., Phoenixville, Pa.

THE SOUTH

700 Tons, Miami, Fla., hangar for Pan American Airways, to Ingalls Iron Works Co., Birmingham.



**This TEAM Makes Its
BIGGEST "HIT"
When The Pressure's On!**

MACWHYTE *Atlas* SLINGS



*made from LEFT-&RIGHT LAY
Endless Wire Ropes to S-P-E-E-D
Your Loads SAFELY!*

Because they're made of braided construction (patented), Macwhyte Atlas Slings are . . .

Absolutely NON-SPINNING:

Extremely flexible, kink-resistant, light-weight, easy to handle, SAFE:

Extra long lasting, because the left-lay AND right-lay wire ropes work together — a balanced construction with each part carrying its share of the load.

Send for Sling Catalog S-6 on Company letterhead stating title.

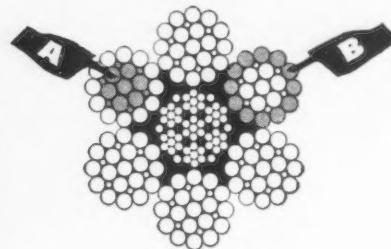
Patented, braided body made from left-&-right lay endless wire ropes



MACWHYTE COMPANY, 2911 Fourteenth Avenue, Kenosha, Wisconsin. Manufacturers of wire rope to meet every need—left-&-right lay braided slings—Stainless Steel Wire Rope—Aircraft cable, Aircraft tie rods, and "Safe-Lock" Swaged Terminals.

New York • Pittsburgh • Chicago • Ft. Worth • San Francisco • Portland • Seattle • Distributors throughout the U. S. A.

MACWHYTE PReformed CRANE ROPES



*made with 2 kinds
of wire for EXTRA staying power.*

A. Extra Flexible Inner Wires in every Monarch Whyte Strand PReformed rope are improved plow steel . . . specially designed with extra flexibility for service inside the strands.

B. Extra Tough Outer Wires in Monarch PReformed are also improved plow steel. They are made with a tough wear-resisting "skin" specially for service on outside strands.

PLUS INTERNAL LUBRICATION . . . which protects unseen, inside wires which are the reserve strength of your rope upon which safety depends.

*Use the CORRECT rope for your equipment
MACWHYTE PReformed CRANE ROPE*



150 Tons, Fort Sumner, N. M., State underpass, FAGH-96-(3), for Atchison, Topeka & Santa Fe Railroad, to American Bridge Co., Pittsburgh.

CENTRAL STATES

18,000 Tons, Burns City, Ind., four warehouses, to Bedford Foundry & Machine Co., Bedford, Ind.

2190 Tons, Chicago, subway, to American Bridge Co., Pittsburgh.

1250 Tons, Rock Island, Ill., bridge, to American Bridge Co., Pittsburgh.

517 Tons, Nora, Ind., State highway bridge, to Central States Bridge & Structural Works, Indianapolis.

370 Tons, Cleveland, technical service building for National Committee of Aeronautics, to Invalis Iron Works Co., Pittsburgh plant.

215 Tons, Oak Forest, Ill., State highway bridge, to Bethlehem Steel Co., Bethlehem, Pa.

140 Tons, Elyria, Ohio, building for Elyria Foundry Co., to Mooney Iron Works, Cleveland.

130 Tons, Detroit, building extension for Bickers, Inc., to R. C. Mahon Co., Detroit.

WESTERN STATES

3500 Tons, San Pedro, Cal., accumulated awards, fleet operating base, to Columbia Steel Co., San Francisco, through Atkinson & Pollock, contractors.

2250 Tons, Wilmington, Cal., Bureau of Power and Light steam plant, to Bethlehem Steel Co., Los Angeles.

150 Tons, Santa Maria, Lompoc, Cal., armored division cantonment, to Fair Mfg. Co., San Francisco, through MacDonald & Kahn, San Francisco, and J. F. Shea, Los Angeles, contractors.

103 Tons, Sapinero, Colo., State highway bridge between Sapinero and Cimarron on State highway No. 6, FAP 125 (4), to Kansas City Structural Steel Co., Kansas City, Kan., through A. S. Horner, Denver, contractor.

CANAL ZONE

925 Tons, Panama Canal, hangar for War Department, to Ingalls Iron Works Co., Birmingham.

PENDING STRUCTURAL STEEL PROJECTS

NORTH ATLANTIC STATES

2000 Tons, New York, tunnel, Mason & Hanger general contractors; bids in.

1500 Tons, Long Island City, N. Y., foundry, boiler and service buildings for Sperry Gyroscope Co.

1250 Tons, New York, apartment house, 92nd Street and Fifth Avenue, for 1111 Fifth Avenue, Inc.

800 Tons, Nassau, L. I., government sponsored manufacturing plant; Stone & Webster, Inc., Boston, engineers.

580 Tons, Boston, hospital addition for Massachusetts General Hospital.

460 Tons, Everett, Mass., turbine pedestals for Boston Edison Co.

390 Tons, Portsmouth, N. H., three storehouses, "D," "E" and "F," for Navy.

255 Tons, Nyack, N. Y., cradles for Rockland Light & Power Co.

200 Tons, El Dorado, N. H., State bridge.

130 Tons, Lehighton, Carbon County, Pa., State bridge, section 1-B, TR-535.

110 Tons, Niagara Falls, N. Y., cell-room building for Niagara Alkali Co., to R. S. McMannis Steel Construction Co., Inc., Buffalo.

THE SOUTH

7150 Tons, Elizabeth City, N. C., and South Weymouth, Mass., hangars for Navy.

833 Tons, San Antonio, Tex., truck sheds for Fort Sam Houston; bids in.

CENTRAL STATES

925 Tons, Mackinac County, Mich., State bridge SN-F-B-3 of 49-5-12, C-2.

175 Tons, Fort Custer Drive, Mich., State bridge X-1 of 13-3-6.

102 Tons, Montpelier, Ohio, project No. 228, bridge; bids Sept. 30.

WESTERN STATES

3500 Tons, Bonneville, Ore., Bonneville-Vancouver transmission line No. 5, circuits 5 and 6, (Invitation 2237); bids Sept. 29.

1000 Tons, Burbank, Calif., Vega Airplane Co. buildings 82 and 83.

170 Tons, Tetonia, Idaho, floor system, trestle FAP-149-A (2) for State.

CONSTRUCTION STEEL

FABRICATED PLATES

AWARDS

- 3325 Tons.** Jersey City, N. J., 25 barges for Pennsylvania Railroad, to American Bridge Co., Pittsburgh.
2500 Tons. Pit River, Cal., Pacific Gas & Electric Co. penstocks, to Western Pipe & Steel Co., San Francisco.

STEEL PILING

AWARDS

- 4000 to 5000 Tons.** San Pedro, Cal., accumulated awards, fleet operating base, as follows: 3000 to 4000 tons to Columbia Steel Co., San Francisco; 1000 tons to Bethlehem Steel Co., Los Angeles, through Atkinson & Pollock, contractors.

Reinforcing Steel

Awards of 16,700 tons; 8100 tons in new projects.

AWARDS

ATLANTIC STATES

- 1200 Tons.** Philadelphia, Bartram Gardens, defense housing projects 36014X, 36015X, to Jones & Laughlin Steel Corp., Pittsburgh, through Fireproof Products; Knickerbocker Concrete Arch Construction Co.
480 Tons. Lester, Pa., defense products plant, Westinghouse Electric & Mfg. Co., to Bethlehem Steel Co., Bethlehem, Pa.; United Engineers & Constructors, contractors.
400 Tons. Hartford, Conn., dike, to Truscon Steel Co., Boston, through A. J. Savin Construction Co., Hartford, contractor.
394 Tons. Butler County, Pa., mesh and bars, route 73, sections R4 and R5, to Truscon Steel Co., Youngstown, through Ralph Myers Construction Co.
350 Tons. Kittanning, Pa., plant for Linde Air Products Co., to Bethlehem Steel Co., Bethlehem, Pa.; James Stewart & Co., contractors.
300 Tons. Philadelphia, Frankford Arsenal optical shop, to Bethlehem Steel Co., Bethlehem, Pa.
306 Tons. South Boston, U. S. Engineering unit, to Joseph T. Ryerson & Son, Inc., Cambridge, Mass.
250 Tons. E. Hartford, Conn., Pratt & Whitney two test houses, to Bethlehem Steel Co., Bethlehem, Pa.; Turner Construction Co., contractor.
100 Tons. East Hartford, Conn., government pumping station, to Concrete Steel Co., Boston.
100 Tons. Newport, R. I., government wharf, to Concrete Steel Co., Boston.

THE SOUTH

- 1400 Tons.** Childersburg, Ala., high explosives plant, Alabama Ordnance Works, to Truscon Steel Co., Birmingham.
600 Tons. Fort Smith, Ark., Camp Berling cantonment, to Ceco Steel Products Co., Chicago, and Sheffield Steel Corp., Kansas City, Mo., through A. F. Blair, contractor.
127 Tons. Houston, Tex., quartermaster's construction, to Truscon Steel Co., Youngstown.

CENTRAL STATES

- 4000 Tons.** Marion, Ill., Crab Orchard Ordnance Works, to Ceco Steel Products Co., Chicago.
3000 Tons. Louisiana, Mo., Missouri Ordnance Works, to LaClede Steel Co., St. Louis, Pechtel, McCone & Parsons, contractors.
300 Tons. St. Louis, American Can Co. plant and offices, to Joseph T. Ryerson & Son, Inc., St. Louis; Norris Construction Co., contractor.
150 Tons. Sagola, Mich., Wisconsin-Michigan Power Co. tunnels, to Bethlehem Steel Co., Bethlehem, Pa.; Bacco Co., contractor.
126 Tons. Sault Ste. Marie, Mich., government warehouse, to Truscon Steel Co., Youngstown.
120 Tons. Kaukauna, Wis., Thilmany Pulp & Paper Co., to Worden-Allen Co., Milwaukee.

WESTERN STATES

- 6000 Tons.** Azusa, Cal., Santa Fe Dam, awarded jointly to Ceco Steel Products Co., Soule Steel Co., and Blue Diamond Corp., all of Los Angeles, through Morrison-Knudsen, Winston Bros., F. J. Twain and J. F. Shea, Los Angeles, contractors.
3000 Tons. San Pedro, Cal., fleet operating

Weekly Bookings of Construction Steel

Week Ended	Sept. 23,	Sept. 16,	Aug. 26,	Sept. 24,	Year to Date	
	1941	1941	1941	1940	1941	1940
Fabricated structural steel awards	32,900	15,600	10,300	42,030	1,033,695	745,865
Fabricated plate awards	5,825	2,100	305	4,545	104,835	117,250
Sheet steel piling awards	4,500	0	130	2,170	25,260	38,210
Reinforcing bar awards	16,700	10,310	27,700	6,520	545,550	346,545
Total letting of Construction Steel	59,925	28,010	38,435	55,265	1,709,340	1,247,870

base, to Ceco Steel Products Co., Los Angeles, through Atkinson & Pollock, contractors.

275 Tons. Los Angeles, requirements for Department of Water and Power, to Soule Steel Co., Los Angeles.

LIGHTER GAUGE STAMPINGS, too



The versatility of our men and machines is limited only by the needs of those who entrust to us the important task of producing their stampings.

In the instance illustrated, a Tank Rim for an electrical transformer—**16 3/4" long, 18 1/8" wide and 5 1/4" deep**—was stamped out of steel .075" thick. Yet each angle, arc, port and flange is clean and clear—and true to gauge.

Present your problems to Parish. The services of our engineers frequently result in economies of important proportions . . . yet their contributions are not evident in our costs.

Let us review your requirements.

PARISH PRESSED STEEL CO. READING, PA.

PACIFIC COAST REPRESENTATIVE, F. Somers Peterson Co., 57 California St., San Francisco, Cal.

CONSTRUCTION STEEL

PENDING REINFORCING BAR PROJECTS

ATLANTIC STATES

- 2500 Tons, Suitland, Md., Federal office building; McCloskey Co., contractor.
- 1400 Tons, Queens, N. Y., superstructure, grade separation; Garafano Construction Co., contractor.
- 1000 Tons, Boston, harbor fortifications.
- 500 Tons, Springfield, Mass., armory gun shop.
- 380 Tons, Wilkes Barre, Pa., Soloman Creek
- 380 Tons, Queens, N. Y., substructure, grade separation; Raymond Concrete Pile Co., contractor.
- 200 Tons, Armstrong County, Pa., highway project R-03087, section 1.
- 100 Tons, Watertown, Mass., government arsenal.

CENTRAL STATES

- 340 Tons, Knowlton, Wis., Consolidated Power & Paper Co. station.
- 340 Tons, Pontiac, Mich., Pontiac service and parts building.
- 200 Tons, West Lafayette, Ind., Purdue University dormitory.
- 160 Tons, Carbondale, Ill., Department of Agriculture.
- 140 Tons, Carbondale, Ill., Southern Illinois State Teachers College.
- 140 Tons, Brokaw, Wis., Brokaw Dam repairs.

WESTERN STATES

- 270 Tons, Keswick, Cal., Keswick Dam (Invitation 33,399-A); bids in.

Pipe Lines

- **Gas Utilities Co., Inc.**, Robinson, Ill., plans new welded steel pipe line from Robinson, where connection will be made with main system, to Okolong, Ill., about nine miles, for natural gas transmission for service in latter area.

Atlantic Refining Co., 260 South Broad Street, Philadelphia, plans extension of Middlesex pipe line along roadbed of Central Railroad of New Jersey at Newark, N. J., and vicinity, for gasoline transmission.

Waveland, Miss., plans extensions and replacements in natural gas pressure pipe line system, including facilities for increased service. Cost about \$80,000; also extensions and improvements in water pipe lines and other waterworks installation. Cost approximately \$125,000. Bonds in gross amount of \$205,000 have been voted for projects. F. F. Joseph, Glenmora, La., is consulting engineer.

Navy Purchasing Office, Navy Department, 315 Montgomery Street, San Francisco, asks bids until Sept. 29 for 9648 ft. of zinc-coated, seamless galvanized steel pipe for Mare Island Navy Yard, Vallejo, Cal. (Schedule 8005).

Panhandle Eastern Pipe Line Co., 1223 Balmoral Street, Kansas City, Mo., plans welded steel pipe line from connection with present main transmission system in Illinois to Galesburg, Ill., for natural gas supply at latter place, where distribution will be carried out by Illinois-Iowa Power Co. First noted company proposes to reclaim about 43 miles of 8-in. pipe from section of Mildred-Kincaid pipe line in Kansas, previously furnishing natural gas service to a cement mill in that area, now abandoned, and use for Galesburg line. Illinois-Iowa company will make change-over from manufactured to natural gas service, with main control station, meter house and other operating facilities.

Bureau of Reclamation, Denver, closes bids Sept. 30 for steel pipe for turbine-inlet for Unit A-5, Boulder power plant, Boulder Canyon project (Specification 1547-D).

Tacoma, Cal., will ask bids Oct. 1 for constructing 9910 ft. of 58-in. coal tar enamel steel pipe or lock joint concrete pipe water main in Park Avenue.

Cast Iron Pipe

• **Odessa, Tex.**, plans pipe line extensions in water system; also other waterworks installation, including elevated steel tank and tower. Cost about \$289,000. Financing is being arranged through Federal aid.

Water Department, Salt Lake City, Utah, plans extensions in water pipe lines, including new main supply line for Utah ordnance plant of government, now in course of construction. Cost about \$135,000. Financing has been arranged through Federal aid.

East Woodland Public Water District, near Puyallup, Wash., care of Parker & Hill, Smith Tower Building, Seattle, consulting engineers, plans pipe lines for water system and other waterworks installation. Cost about \$70,000. Financing is being arranged through Federal aid.

General Purchasing Officer, Panama Canal, Washington, asks bids until Oct. 6 for 2000 ft. of 10-in., 2000 ft. of 8-in., and 3000 ft. of 6-in. cement-lined, cast iron water pipe; also for 500 $\frac{3}{4}$ -in. gate valves (Schedule 5558).

Jefferson County Fresh Water Supply District No. 1, Beaumont, Tex., recently organized, plans pipe lines for water system at Sabine and Sabine Pass districts, including Federal naval base at first noted place. Cost \$290,000, of which \$30,000 will be secured by bond issue and remainder through Federal aid.

Fresno, Cal., will take bids Oct. 2 on 423 tons of 4, 6, 8, 10, and 12-in. cast iron bell and spigot cast iron pipe; class 150.

700 Attend Toronto Advertisers' Convention

Toronto

• • • The National Industrial Advertisers Association held its annual convention at Toronto, Sept. 17, 18 and 19, with more than 700 members attending the meetings. The program included many speakers, but most of the time was devoted to informal panel sessions and round tables at which industrial advertising and merchandising problems were discussed.

At the annual business meeting that ended the convention on Sept. 19, the following new officers were elected: President, W. D. Murphy, Reincke-Ellis, Younggreen & Finn, Chicago; vice-president, H. V. Meready, Magnus Chemical Co., Garwood, N. J.; Louis J. Ott, Ohio Brass Co., Mansfield, Ohio; L. R. Carretson, Leeds & Northrup Co., Philadelphia; Anthony Neher, Century Electric Co., St. Louis; E. C. Howell, Carboly Co., Detroit; A. Phoenix, Johns-Manville Sales Corp., New York. The new secretary-treasurer is D. C. Davenport, Union Steel Products Co., Albion, Mich.

The 1942 conference of the association will be held at Atlantic City, N. J., under the sponsorship of the Industrial Marketers of New Jersey.

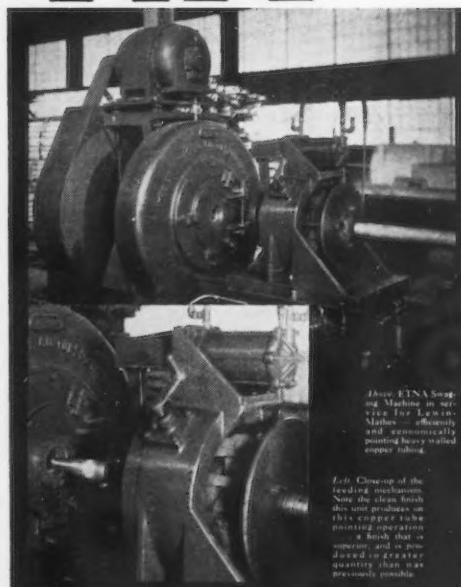
LEWIN-MATHES Got the right answer at

ETNA

They had a job of pointing heavy-walled copper tubing, and wanted to speed up the operation. Just how to do it didn't appear on the horizon, and so Lewin-Mathes did the safe and logical thing—they put their swaging job up to Etna.

The answer to that problem is illustrated on this page. It's a modern Etna Swaging Machine that points **more** copper tubes per hour in less time at less cost. If you have a problem involving tapering or reducing tubing and solid rounds—ask Etna about it.

Etna has the swaging machines from $\frac{3}{8}$ " to 4" and the experience to help you get the most out of this type of machine.



Left: Closeup of the feeding mechanism. Note how easily this unit produces on this copper tube a taper or reduction in diameter, and how much faster and in greater quantity than previously possible.

**IF IT'S A QUESTION OF TAPERING,
SIZING OR REDUCING OF ROUND SOLIDS
OR TUBING...**
**"Ask ETNA
About Swaging"**

ETNA
MACHINE COMPANY
TOLEDO

NEWS OF INDUSTRY

8 Months Ingot Output 10% Above Entire Year of 1917

• • • Production of steel ingots in August totaled 7,000,957 net tons, bringing the amount produced in the first eight months of this year to the record-breaking total of 54,731,182 net tons, according to the American Iron and Steel Institute. Output in August established a new record for that month and was more than 13 per cent above the 6,186,383 tons produced in August, 1940.

The total produced in the first eight months of this year was more than 32 per cent above the 41,316,410 tons produced in the corresponding period of 1940, and 24 per cent above the previous record of 44,137,164 tons, established in

the first eight months of 1929. Compared with production of 49,787,196 in the full year of 1917, output in the first eight months of this year was almost 10 per cent larger.

The operating rate for the industry last month was 95.7 per cent of capacity, compared with 93.4 per cent for July, 1941, and 89.5 per cent for August, 1940.

Gains were reported in August in open hearth, bessemer and electric steel output, with open hearth facilities operating at the highest relative per cent of capacity. Open hearth facilities in August operated at 96.6 per cent of capacity, while electric output was at the rate of 94.4 per cent. Bessemer production was 85.9 per cent of capacity. Data for July in the accompanying table have been revised on the basis of the new ingot capacities as of June 30.

Ohio Plastics Plant Will Be Enlarged

Cleveland

• • • Demand for plastics as replacement for steel by non-defense consumers has resulted in the authorization by the directors of the Vlcek Tool Co. of the construction of a third unit at the company's Middlefield, Ohio, plastics plant. The addition will contain 5000 sq. ft. of floor space and will be completed this fall. The company's plastics department is going full speed to meet requirements of manufacturers of household appliances and other items who have been cut off from their normal steel requirements. Vlcek is getting steel priority for tools for army kits and is building special alloy steel tools for army trucks.

Steel Ingot Production

	OUTPUT IN NET TONS					PER CENT OF CAPACITY			
	Open Hearth	Bessemer	Electric	Total	Weekly Output	Open Hearth	Bessemer	Electric	Total
1940									
January.....	5,356,444	285,447	122,832	5,764,723	1,301,292	85.7	56.1	77.0	83.4
February.....	4,208,249	205,458	112,090	4,525,797	1,093,188	72.1	43.2	75.2	70.9
March.....	4,078,843	191,568	118,772	4,389,183	990,786	65.3	37.6	74.5	63.5
1st Quarter.....	13,643,536	682,473	353,694	14,679,703	1,129,208	74.4	45.7	75.6	72.3
April.....	3,808,031	176,419	116,024	4,100,474	955,821	62.9	35.8	75.1	61.2
May.....	4,583,771	258,741	125,270	4,967,782	1,121,395	73.4	50.8	78.5	71.8
June.....	5,222,120	305,115	130,208	5,657,443	1,318,751	86.3	61.9	84.3	84.5
2nd Quarter.....	13,613,922	740,275	371,502	14,725,699	1,131,875	74.2	49.5	79.3	72.5
1st 6 months.....	27,257,458	1,422,748	725,196	29,405,402	1,130,542	74.3	47.6	77.4	72.4
July.....	5,269,701	322,567	132,357	5,724,625	1,295,164	84.5	63.5	83.2	83.0
August.....	5,670,932	369,770	145,681	6,186,383	1,396,475	90.8	72.6	91.3	89.5
September.....	5,535,198	365,289	155,759	6,055,246	1,415,011	91.7	74.2	101.1	90.6
3rd Quarter.....	16,475,831	1,057,626	433,797	17,967,254	1,368,412	89.0	70.1	91.7	87.7
9 months.....	43,733,289	2,480,374	1,158,993	47,372,656	1,210,339	79.2	55.1	82.2	77.5
October.....	6,059,792	408,317	176,433	6,644,542	1,499,897	97.0	80.2	110.6	96.1
November.....	5,872,162	420,448	176,497	6,469,107	1,507,950	97.1	85.3	114.2	96.6
December.....	5,907,840	399,434	188,083	6,495,357	1,469,538	94.8	78.6	118.2	94.1
4th Quarter.....	17,839,794	1,228,199	541,013	19,609,006	1,492,314	96.3	81.3	114.3	95.6
Total.....	61,573,083	3,708,573	1,700,006	66,981,662	1,281,210	83.5	61.7	90.3	82.1
1941									
January.....	6,271,862	451,637	205,256	6,928,755	1,564,053	99.0	76.0	93.4	96.9
February.....	5,673,289	378,330	186,281	6,237,900	1,559,475	99.2	70.5	93.9	96.6
March.....	6,461,936	460,169	209,536	7,131,641	1,609,851	102.0	77.4	95.4	99.7
1st Quarter.....	18,407,087	1,290,136	601,073	20,298,296	1,578,406	100.1	74.8	94.2	97.8
April.....	6,130,638	395,009	232,081	6,757,728	1,575,228	99.9	68.6	109.1	97.6
May.....	6,360,211	444,361	250,560	7,101,759	1,592,581	100.4	74.8	114.0	98.7
June.....	6,103,767	458,242	238,721	6,800,730	1,585,252	99.5	79.6	112.2	98.2
2nd Quarter.....	18,594,616	1,297,612	721,362	20,613,590	1,584,442	100.0	74.3	109.8	98.2
1st 6 months.....	37,001,703	2,587,748	1,322,435	40,911,886	1,581,441	100.1	74.5	101.6	98.0
July.....	6,089,859	489,239	242,584	6,821,682	1,543,367	94.4	85.0	87.4	93.4
August.....	6,243,100	495,523	262,334	7,000,957	1,580,351	96.6	85.9	94.4	95.7

Source: American Iron and Steel Institute. Data based on reports by companies which in 1940 produced 98.43 per cent of open hearth, 100 per cent of bessemer and 85.82 per cent of electric ingots and steel for castings. Annual capacity, as of Dec. 31, calculated as follows: 1940, open hearth 73,721,592 net tons, bessemer 6,099,920 tons, electric 1,882,630 tons; 1941, to and including June, open hearth 74,565,510 tons, bessemer 6,996,520 tons, electric 2,586,320 tons; beginning July, 1941, open hearth 76,079,130 tons, bessemer 6,793,400 tons, electric 3,272,370 tons, total 86,144,900 tons.

MACHINE TOOLS

. . . SALES, INQUIRIES AND MARKET NEWS

Increase of A-1-a Orders Aggravates Priority Problem

Cleveland

• • • The major complaint of machine tool producers has been the growing volume of A-1-a orders within the last few weeks, especially for certain types of equipment. This indicates a continued use of judgment by shippers in selecting the more urgent orders, despite the general classifications resulting from priorities. Actual orders for a little more equipment in connection with the bomber program are being received at present. Moreover, awards are being awaited on 20-mm., 37-mm., and 40-mm. artillery shell cases, after which there probably will be some buying of presses.

The availability of considerable amounts of old machines was explained by one well posted authority as being due to the fact that many concerns are adverse toward the idea of intense usage of such equipment, in view of the attendant loss of efficiency. At the same time, speed is naturally sacrificed in using old machinery. Another reason for its wide availability is that tolerances on many defense orders are very narrow, many thereby making the use of old machinery impractical in many cases.

The demand for used turret lathes continues unabated, although contentions regarding a lack of such equipment are discounted in some quarters, in view of the availability of from 4000 to 5000 such machines around northern Ohio alone.

Some time ago a machine tool man with no equipment at all made plans to produce machine guns, with the aid of old machines. He obtained considerable equipment of this type from the Rock Island Arsenal and is reported to be successfully turning out machine guns for the government with equipment 75 per cent of which is second hand.

New Defense Projects Added

Chicago

• • • With machine tool production in this section riding an even higher crest than it did two or three months ago, the continuing flow of important defense orders is still more than matching the output stride. Among two of the new prospective buyers are Pullman-Standard Car Mfg. Co., which has received another lease agreement from the Defense Plant Corp., this time the amount being the comparative pittance of \$130,366 for new machinery purchases.

In Rockford, W. F. & John Barnes Co., will spend \$1,558,598 of Uncle Sam's money on machinery and equipment. This is for the new ordnance works to be operated by the Barnes company for the production of components of armor-piercing shell. Construction is underway on the new plant, which will be run as a separate organization from the machine tool business.

The big aircraft engine operations in this section of Buick and Studebaker are proceeding surely, but in some cases, haltingly. Buick did not make its contemplated opening date of Sept. 16; actual start of operations of at least the pilot line may take place within a month. Proceedings at Studebaker are not nearly as smooth as it was hoped they would be.

Last month Gisholt Machine Co., Madison, Wis., announced at an employee picnic that it had produced its 20,000th machine tool.

Machine Castings Tight

Cincinnati

• • • Although there has been no definite dislocation of production because of the tightness of the materials market, the government control of the pig iron market has definitely added another worry to the already heavy load. During the past week, castings producers serving the machine tool trade have begun to complain rather loudly of possible delay in deliveries because of thin allocations of pig iron.

Machine tool manufacturers report that in addition to the steady brisk demand for new tools, the repair part demand, particularly on old type machines, tends heavier.

Machine Tool Shipments At Peak in August

• • • Machine tool shipments in August totaling \$64,300,000 were the highest on record in the history of the industry, the National Machine Tool Builders' Association reports. Shipments reported for July were \$57,900,000 and for June \$63,000,000. In August a year ago shipments were estimated at \$40,800,000.

Gear Sales Decline 7% in August



Sales of industrial gears in August, exclusive of automotive and high speed turbine drive gears, were 7 per cent below the July volume, the American Gear Manufacturers Association reports. The sales index compiled by the association stood at 276 in August, as compared with 298 in July. In August, a year ago, the index was 191. The highest point reached by the index this year was 299 reported for June.

NON-FERROUS METALS

. . . MARKET ACTIVITIES AND PRICE TRENDS

MRC Expands Metal Buying Activities

An amendment to the tin price schedule was announced by OPA this week, reclassifying as Grade B, pig tin that assays at 99.80 per cent pure but does not completely meet Grade A specifications. Under the amendment tin that assays at 99.80 per cent pure but contains impurities exceeding tolerances permitted for Grade A tin, henceforth will be sold at the 38c. discount from the 52c. a lb. Grade A price, under a Grade B classification.

American merchants and importers were advised last week that the New York underwriters reaffirmed war risk insurance rates from the Straits Netherlands East Indies. While several important tin importers are out of the market because they cannot afford to pay the high Far Eastern prices, it is understood that consumers who buy directly from the Far East are submitting bids that, under the present freight and war risk rates, would not bring the cost below the maximum of 51.95c. a lb., c.i.f., New York. They believe that if, between the time of purchase and the time of shipment, an increase in ocean freights or war risk rates would bring the final cost above the ceiling, they will not be held responsible for conditions beyond their control.

MRC this week contracted to buy about 14,000 tons of Australian electrolytic refined lead for delivery over the balance of this year, and C. Tennant Sons & Co., which has been importing Australian refined lead, will distribute the MRC metal, through MRC allocations. American Smelting & Refining Co., and the American Metal Co., Ltd., are the MRC agents for Mexican, Canadian, and Peruvian lead bought by MRC. The first shipment of the Australian purchase is now in New York on three boats, and totals 5000 tons. This lead has already been allocated by OPM to various eastern consumers. The purchase price of the Australian lead has not yet been disclosed.

MRC, in its Sept. 13 report on business, provided \$140,110,000 to

pay for 500,000 tons of Latin American copper that it has contracted to purchase and stated that negotiations are still under way for the entire production of four Latin American interests. Meanwhile, a double price situation on domestic copper is expected to develop following SPAB's decision to increase high cost copper production. High cost producers were informed that they would be permitted a maximum price for copper to cover an advance in wages of \$1 a day, as recommended by OPM's labor division, and high operating costs. MRC will probably sell copper for these high cost mines between 14c. and 16c. a lb. The proposed deal involves three Michigan companies and several producers in Arizona and other western states, and may bring into production several mines not now operating. OPM priority control over copper scrap is expected to be announced to the trade.

Reports that zinc buyers are being charged as high as 16c. a lb., are being investigated by OPA. Informal agreements have kept zinc prices around 7 1/4c. a lb., since May, but Middle West buyers without defense priority ratings were recently being charged these higher prices.

Non-Ferrous Prices

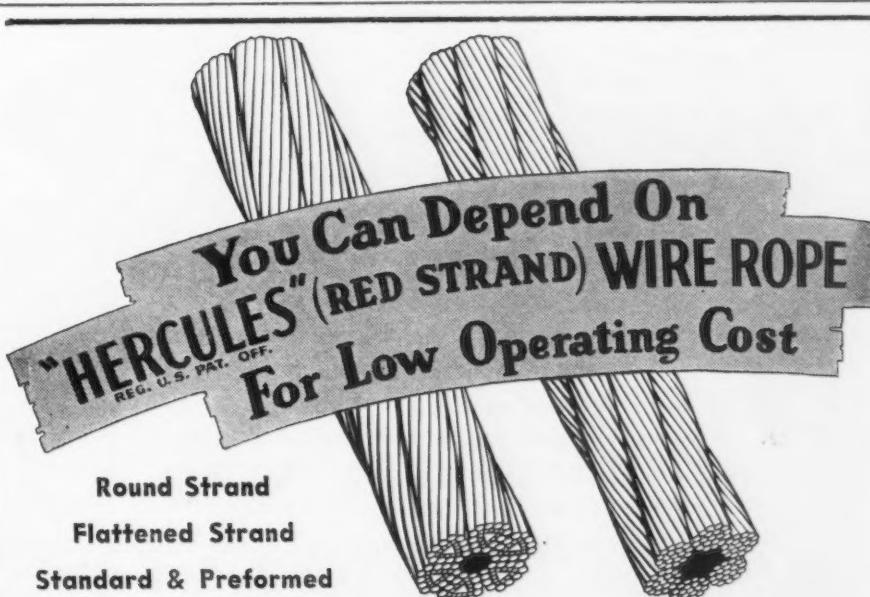
(Cents per lb. for early delivery)

Copper, Electrolytic ¹	12.00
Copper, Lake	12.00
Tin, Straits, New York	52.00
Zinc, East St. Louis ²	7.25
Lead, St. Louis ³	5.70

¹ Mine producers' quotations only, delivered Conn. Valley. Deduct 1/4c. for approximate New York delivery price. ²Add 0.39c. for New York delivery. ³Add 0.15c. for New York delivery.

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 17c.-18c. a lb.; No. 12 remelt No. 2, standard, 16c. a lb. NICKEL electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICKSILVER, \$193. per flask of 76 lb. BRASS INGOTS, commercial 85-5-5, 13.25c. a lb.



WHY not let "HERCULES" (Red-Strand) Wire Rope help you meet present day production requirements and still maintain a reasonable margin of profit? You will quickly discover that "HERCULES" is a dependable ally—not only in today's fight against increasing operating costs—but also in your endeavor to speed up production.

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SCRAP

... MARKET ACTIVITIES AND PRICE TRENDS

Low Phos Shortage Grows More Severe

• • • Allocation of scrap supplies is awaited at several steel production centers where high output for the defense program cannot be maintained much longer unless scrap receipts improve. The allocation maneuver probably will result in complexities.

Particularly serious during the past week has been the problem of electric furnace operators, who despite every conceivable measure are unable to overcome the handicap of dwindling low phos supplies. Other units producing raw steel are being held below their maximum.

Equally disappointing has been the slowness of scrap iron ship-

ments needed by foundries all over the country. Quantities generally are below consumption. When material is needed badly to avert cessation of defense production and to protect men's jobs, the temptation to pay over the established price ceilings is very great.

Amendments to bring about a parity among consumers who purchase iron and steel scrap in the Cincinnati market were announced at Washington this week. The change provides a shipping point price within the Cincinnati basing point of 80c. a ton below the basing point price for all grades of scrap except six cast grades. This revision was made because of the great variation in switching charges within the Cincinnati basing point. OPA said no adverse effect would be created on

local consumers by the change, while inequalities will be removed for outside consumers who have been purchasing scrap there.

Relaying Rails Lack Control; Scrap Rail Price Revised

• • • Price control apparently does not exist over relaying rails at the moment, THE IRON AGE learned last week. Several weeks ago they were removed from the scrap price schedule and placed under the iron and steel schedule, but Washington authorities have not yet completed the necessary amendment to the iron and steel schedule and consequently are unable to say what basing points are to be used in computing such prices in various areas, or whether the same method of price determination is to be used as was permitted under the scrap schedule.

Meanwhile, OPA announced a revision of the scrap schedule to provide "an attractive price" at which mines, logging camps and similar sources can sell scrap rails for rerolling. It is stipulated that the maximum shipping point prices for this type of scrap shall be the ceiling prices set in the schedule (which apply specifically to scrap of railroad origin) "except that the maximum shipping point price need in no case be less than \$13.50 per gross ton for scrap rail and \$15.00 per gross ton for rails for rerolling." In addition, the formalities generally required from railroads upon the sale of scrap rail or rerolling rail are eliminated when the seller is a mine or logging camp.

Lack of Pig Iron May Cut Andrews Steel Ingot Rate Newport, Ky.

• • • Cut of pig iron allocations of the Andrews Steel Co. under what company officials report are their actual needs, may bring about a reduction in open hearth operations. According to recent pig iron allocations, this company reports that it is being held to a three to four day supply, with the amount

SAVE YOUR TOOLS from an early death



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The
RUTHMAN
Machinery Company
1821 READING ROAD, CINCINNATI, OHIO, U.S.A.



SCRAP

of tonnage below the normal melt. According to company estimates, when present inventory is exhausted, the allocation of pig iron will probably force the reduction of about two open hearths from the present seven in operation.

Pittsburgh—With several steel companies unable to operate open-hearth units at capacity, mainly because of inability to obtain additional scrap supplies, the acute shortage of low phos scrap has also hit electric steel producers. After exhausting all the short cuts possible in order to maintain electric steel production which is slated 100 per cent for defense requirements, some electric steel makers, because of inability to obtain sufficient low phos scrap, or any other kind for that matter, may in the near future be forced to curtail actual production. Reports persist the Government may soon have to allocate available scrap supplies on the basis of the volume of national defense business in the hands of steel makers needing scrap. If this procedure is followed, some sources believe current scrap difficulties represent mere child's play compared with the headaches and problems which would be involved in allocating scrap on the basis of defense business.

Buffalo—Shipments are maintaining the fair level that has prevailed for several weeks but dealers are complaining about bids above the ceiling prices outside this district. A veteran dealer reports a number of small plants are holding onto their scrap in the hope of getting a better price.

Birmingham—Danger of the scrap shortage adversely affecting steel production in this district is undiminished. At the present rate of decline stock piles at steel mills in this area will be completely exhausted within 30 days unless flow is materially increased.

Cincinnati—Scrap dealers and brokers in this area are taking a fatalistic attitude. They seem to feel that since the Government has taken out of their hands the job of supplying mills with scrap, they are going to abide by Government orders, and if they can supply the scrap, well and good, but if they can't, then the steel mills will have to shut down if they are without material.

Cleveland—With the flow of scrap to mills slackened dangerously, the trade and its consumers await some action from Washington to forestall the impending climax. If the movement of scrap were to be quickened, it was expected some concession might be made such as permission to charge f.o.b. shipping point prices.

As a step toward simplification of the price structure, one dealer suggested that one top price each prevail for open-hearth grades, blast furnace grades, and electric grades, thereby permitting consumers to pay openly up to such prices for inferior grades. This would eliminate the present bare-faced misnomer of most scrap transactions. The mills and the foundries would know in advance just what they were buying, since the current disregard for grade designations would disappear.

Work Begun on 37 mm. Shell-Making Plant

Rockford, Ill.

• • • Work has started on the \$2,000,000 ordnance plant for production of metal components of 37 mm. armor piercing shell, to be operated by W. F. & John Barnes Co., machine tool manufacturers, on a fee basis. The factory is paid for by Defense Plant Corp.

Strike Blocking Airplane Gear Production Ends

Chicago

• • • Two day tie-up of \$8,000,000 in airplane gear orders at Foote Bros. Gear & Machine Corp. here has been settled. The company granted a raise of 10c. per hour bringing minimum wages for all workers to 75c. per hour, and double pay for holidays and Sundays.

Lifting is important in production . . .

... AND IN THE WORDS "SHAW-BOX CRANES"
IS ALL OF LIFTING IN RANGES FROM 500 LBS. TO 450 TONS

Shaw-Box cranes are lifting a huge share of the materials and equipment and effectively speeding up all-out defense production. Speed in handling, convenience, dependability and economy are a few of the basic reasons for specifying "SHAW-BOX" cranes.

Reliable, low cost crane service depends upon modern design and proved special features that are only evolved out of the experiences of years.

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| 2. Anti-friction Bearings | 6. "ShaWeld" Gears |
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| 4. Rotating Wheel Axles | 8. Oil bath operation of all parts. |

You do not pay extra for these modern features which are found only in SHAW-BOX CRANES. That's why, for the work they do, they are the least expensive to buy and use.

Send for catalog with complete information, illustrations, dimensions and specifications. Make us prove economy of installation by allowing us to quote on your crane requirements. SHAW-BOX CRANES themselves will prove their low operating cost and speedy, adaptable service.

SHAW BOX CRANE & HOIST DIVISION
MANNING, MAXWELL & MOORE, INC.
MUSKEGON . . . MICHIGAN

Iron and Steel Scrap (other than railroad scrap)

(Maximum basing point prices as revised by OPACS to Sept. 22, 1941, from which shipping point prices and consumers' delivered prices are to be computed, per gross ton)

Basing Points →	Pittsburgh	Johnstown Wairton Steubenville Youngstown Warren Sharon Canton	Chicago	Kokomo	Bethlehem	Claymont Coatesville Phoenixville Harrisburg	Sparrows Point	Buffalo	Cleveland	Toledo	* Cincinnati Portsmouth Ashland	St. Louis	Detroit	Duluth Minneapolis	Birmingham	Chatanooga	Radiod, Va.	Worcester	Bridgerton Phillipsdale, R.I.	Los Angeles San Francisco Seattle Portland	Minnequa. Colo.
No. 1 heavy melting	\$20.00	\$20.00	\$18.75	\$18.25	\$18.25	\$18.75	\$18.75	\$19.25	\$19.50	\$19.50	\$17.50	\$17.85	\$18.00	\$17.00	14.50	16.50	
No. 1 hyd. comp. black sheet	20.00	20.00	18.75	18.25	18.25	18.75	18.75	19.25	19.50	19.50	17.50	17.85	18.00	17.00	14.50	16.50	
No. 2 heavy melting	19.00	19.00	17.75	17.25	17.25	17.75	17.75	18.25	18.50	18.50	16.50	16.85	17.00	16.00	13.50	15.50	
Dealers' No. 1 bundles	19.00	19.00	17.75	17.25	17.25	17.75	17.75	18.25	18.50	18.50	16.50	16.85	17.00	16.00	12.50	14.50	
Dealers' No. 2 bundles	18.00	18.00	16.75	16.25	16.25	16.75	16.75	17.25	17.50	17.50	15.50	15.85	16.00	15.00	9.75	11.75	
Mixed borings and turnings	15.25	15.25	14.00	14.25	13.50	14.00	14.00	14.50	14.75	13.10	14.75	12.75	13.10	13.10	12.25	10.00	12.00	
Machine shop turnings	15.50	15.50	14.25	14.50	13.75	14.25	14.25	14.75	15.00	13.35	15.00	13.00	13.35	15.50	15.00	15.00	15.00	15.00	14.50	16.50	
Shoveling turnings	16.50	16.50	15.25	15.50	14.75	15.25	15.25	15.75	16.00	14.35	16.00	14.00	14.35	16.50	16.00	16.00	16.00	16.00	11.00	13.00	
No. 1 busheling	19.50	19.50	18.25	17.75	17.75	18.25	18.25	18.75	19.00	17.00	19.00	17.00	17.35	17.50	16.00	16.00	16.00	14.00	16.00		
No. 2 busheling	15.50	15.50	14.25	13.75	13.75	14.25	14.25	14.75	15.00	13.00	15.00	13.00	13.35	13.50	12.50	12.50	12.50	10.00	12.00		
Cast iron borings	15.75	15.75	14.50	14.00	14.00	14.50	14.50	15.00	15.25	13.60	15.25	13.50	13.60	13.75	12.75	12.75	12.75	10.25	12.25		
Uncut structural, plate scrap	19.00	19.00	17.75	17.25	17.25	17.75	17.75	18.25	18.50	17.00	18.50	18.00	18.65	17.00	16.00	16.00	16.00	13.50	15.50		
No. 1 cupola	21.00	21.00	20.00	20.00	22.50	23.00	22.00	20.00	22.00	21.00	20.00	20.35	*19.00	20.00	20.50	21.00	22.00	22.00	18.00		
Heavy breakable cast	19.50	19.50	18.50	18.50	21.00	21.50	21.00	21.50	20.50	19.50	18.50	18.50	*17.50	18.50	18.50	20.50	17.00	17.00	17.00		
Stove plate	19.00	19.00	17.00	16.00	18.00	18.50	18.00	19.00	18.00	15.60	17.50	17.00	14.10	*16.00	17.00	17.50	18.00	17.50	14.00		
Low phos. billet, bloom crops	25.00	25.00	23.75	23.75	23.25	23.75	23.75	24.25	24.50	21.50	23.50	22.50	22.85	23.00	22.00	22.00	22.00	19.50	19.50		
Low phos. bar crops, smaller	23.00	23.00	21.75	21.75	21.25	21.75	21.75	22.25	22.50	21.50	20.50	20.85	21.00	20.00	20.00	20.00	20.00	19.50	19.50		
Low phos. pu'ch'gs., plate scrap ¹	24.75	23.00	21.75	21.75	21.25	21.75	21.75	22.25	22.50	21.50	20.50	20.85	21.00	20.00	20.00	20.00	20.00	17.50	17.50		
Machinery cast, cupola size ²	22.00	22.00	21.00	21.00	23.50	24.00	23.50	21.00	23.00	22.00	21.00	21.35	*20.00	21.00	21.50	22.00	23.00	19.00	19.00		
No. 1 mach. cast, drop-broken, 150 lb. and under	22.50	22.50	21.50	21.50	24.00	24.50	24.00	21.50	23.50	22.50	21.50	21.85	20.50	21.50	22.00	22.50	23.50	19.50	19.50		
Clean auto cast	22.50	22.50	21.50	21.50	24.00	24.50	24.00	21.50	23.50	22.50	21.50	21.85	20.50	21.50	22.00	22.50	23.50	19.50	19.50		
Punchings and plate scrap ³	23.75	22.00	20.75	20.75	20.25	20.75	20.75	21.25	21.50	20.50	19.50	19.85	20.00	19.00	20.00	20.00	16.50	16.50			
Punchings and plate scrap ⁴	22.75	21.00	19.75	19.75	19.25	19.75	19.75	20.25	20.50	19.50	18.50	18.85	19.00	18.00	18.00	18.00	15.50	15.50			
Heavy axle, forge turnings	21.25	19.50	18.25	18.25	17.75	18.25	18.25	18.75	19.00	17.00	17.35	17.50	18.50	18.50	18.50	18.50	14.00	14.00			
Medium hvy. el. f.c.e. turnings	19.75	18.00	16.75	16.75	16.25	16.75	16.75	17.25	17.50	16.50	15.50	15.85	16.00	15.00	15.00	15.00	12.50	12.50			

¹ This grade is $\frac{3}{4}$ -in. and heavier, cut 12 in. and under. ² May include clean agricultural cast. ³ Under $\frac{3}{4}$ to $\frac{1}{4}$ -in., cut 12 in. and under. ⁴ Under $\frac{1}{4}$ -in. to No. 12 gage, cut 12 in. and under. ⁵ Youngstown, Warren, Sharon and Canton are not basing points on this grade. Middle town and Cincinnati price for this grade is \$15. ⁶ Includes Newport, Ky. Shipping point price within Cincinnati basing point may be 80c. a ton below basing point price listed above for all grades except the six east grades. ⁷ Minneapolis and St. Paul are basing points on following grades only: No. 1 cupola, heavy breakable cast, stove plate, machinery cast cupola size, No. 1 machinery cast drop broken, clean auto cast.

Railroad Scrap (Per gross ton, delivered consumers' plants located on line of railroad originating scrap)

Where the railroad originator of the scrap operates in two or more of the basing points named, the highest of the maximum prices established for such basing points shall be the maximum price of the scrap delivered to a consumer's plant at any point on the railroad's line, except that switching charges of 84c. per gross ton shall be subtracted from the maximum prices of scrap originating from railroads operating in Chicago and sold for consumption outside Chicago.

Basing Points →	Pittsburgh Sharon, Pa. Wheeling Steubenville Youngstown Canton	Chicago	Kokomo	Philadelphia	Wilmingtn	Sparrows Point	Cleveland	Buffalo	Portland Middletown Ashland	St. Louis	Kansas City	Detroit	Duluth	Birmingham	Los Angeles San Francisco Seattle	
No. 1 heavy melting	\$21.00	\$19.75	\$19.25	\$19.75	\$19.75	\$19.75	\$20.50	\$20.25	\$20.50	\$18.50	\$17.00	\$18.85	\$19.00	\$18.00	\$15.50	
Scrap rails	22.00	20.75	20.25	20.75	20.75	20.75	21.50	21.25	21.50	21.00	19.50	18.00	19.85	20.00	19.00	16.50
Rerolling rails	23.50	22.25	21.75	22.25	22.25	22.25	23.00	22.75	23.00	21.00	19.50	21.35	21.50	20.50	18.00	
Scrap rails 3 ft. and under	24.00	22.75	22.25	22.75	22.75	22.75	23.50	23.25	23.50	21.50	20.00	21.85	22.00	21.00	18.50	
Scrap rails 2 ft. and under	24.25	23.00	22.50	23.00	23.00	23.00	23.75	23.50	23.75	21.75	20.25	22.10	22.25	21.25	18.75	
Scrap rails 18 in. and under	24.50	23.25	22.75	23.25	23.25	23.25	24.00	23.75	24.00	22.00	20.50	22.35	22.50	21.50	19.00	

Railroads not operating in a basing point may sell rerolling rails f.o.b. their lines at average price of their sales from Sept. 1, 1940, to Jan. 31, 1941. Rerolling mills may absorb all transportation charges necessary to obtain such rails. Maximum prices for scrap rails and rerolling rails from mines, logging camps and similar sources need not be sold for less than \$13.50 a gross ton for scrap rails and \$15 for rerolling material at shipping point.

Explanatory Notes

(A basing point includes its switching district.)

the New England shipping point to Johnstown; (2) Shipping point prices for New York City, Brooklyn, New York, and New Jersey shall be computed from the Bethlehem, Pa., basing point.

GULF PORT PRICES: Scrap shipped from Tampa, Pensacola, Gulfport, Mobile, New Orleans, Lake Charles, Port Arthur, Beaumont, Galveston, Texas City, Houston and Corpus Christi, has a maximum shipping point price not exceeding \$14 a gross ton, f.o.b. cars, for No. 1 heavy melting steel. For other grades, the differentials established for Birmingham apply.

REMOTE SCRAP: Material located beyond the zone from which the railroad freight rate to Pittsburgh is \$11.20 is called remote scrap. Consumers desiring to purchase such scrap, but unable to do so without exceeding the ceiling prices, may make application to OPACS for permission to absorb the excess freight charges.

UNPREPARED SCRAP: Regardless of source, maximum price of unprepared scrap is \$2.50 less than maximum for corresponding grade of prepared scrap.

BILLET AND BLOOM CROPS: Where such material originates in the Pittsburgh basing point, it may be sold delivered to a consumer within or without the Pittsburgh point at the price given in Schedule A, plus not more than \$2.50 in transportation charges. Lowest established transportation charges will govern.

Non-Ferrous Scrap

(Dealers buying prices, cents per lb.)

New York	Philadelphia	Pittsburgh	Cleveland	Detroit	Chicago
*10.00	*10.00	*10.00	*10.00	*10.00	*10.00
* 8.00	* 8.00	* 8.00	* 8.00	* 8.00	* 8.00
6.25-6.50	*6.25	7.50-8.00	5.75-6.25	7.00-7.25	7.50
5.25-5.50	*5.50	7.03-7.25	6.00-6.50	6.50-6.75	7.00-7.25
8.75-9.00	*7.75	*9.03-9.25	8.50-9.00	9.00-9.25	9.00-9.25
8.00-8.25	8.50-9.00	7.75-8.00	8.00-8.50	7.50-8.00	7.75-8.25
5.25-5.50	5.00-5.25	4.75-5.00	4.75-5.00	5.00-5.25	4.75-5.00
4.90-4.25	4.25	4.25-4.50	4.00-4.25	4.25-4.50	4.25-4.50
*11.00	*11.00	*11.00	*11.00	*11.00	*11.00
*11.00	*11.00	*11.00	*11.00	*11.00	*11.00
8.75-9.00	9.00	7.50-8.00	6.50-6.75	5.50-6.00	7.50-8.00
35.00-36.00	35.00-36.00	31.00-32.00	32.50-34.00	37.50-38.50	32.00-34.00

. . . Comparison of Prices

(Advances Over Past Week in **Heavy Type**; Declines in *Italics*)

(Prices Are F.O.B. Major Basing Points)

	Sept. 23, 1941	Sept. 16, 1941	Aug. 26, 1941	Sept. 24, 1940		Sept. 23, 1941	Sept. 16, 1941	Aug. 26, 1941	Sept. 24, 1940
Flat Rolled Steel:									
(Cents Per Lb.)									
Hot rolled sheets	2.10	2.10	2.10	2.10		No. 2 fdy., Philadelphia ..	\$25.84	\$25.84	\$24.84
Cold rolled sheets	3.05	3.05	3.05	3.05		No. 2, Valley furnace	24.00	24.00	23.00
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50		No. 2, Southern Cin'ti	24.06	24.06	23.06
Hot rolled strip	2.10	2.10	2.10	2.10		No. 2, Birmingham	20.38	20.38	19.38
Cold rolled strip	2.80	2.80	2.80	2.80		No. 2, foundry Chicago†	24.00	24.00	23.00
Plates	2.10	2.10	2.10	2.10		Basic, del'd eastern Pa	25.34	25.34	24.34
Stain's c.r. strip (No. 302)	28.00	28.00	28.00	28.00		Basic, Valley furnace	23.50	23.50	22.50
Tin and Terne Plate:									
(Dollars Per Base Box)									
Tin plate	\$5.00	\$5.00	\$5.00	\$5.00		Malleable, Chicago‡	24.00	24.00	23.00
Manufacturing terne	4.30	4.30	4.30	4.30		Malleable, Valley	24.00	24.00	23.00
Bars and Shapes:									
(Cents Per Lb.)									
Merchant bars	2.15	2.15	2.15	2.15		L. S. charcoal, Chicago	31.34	31.34	30.34
Cold finished bars	2.65	2.65	2.65	2.65		Ferromanganese‡	120.00	120.00	120.00
Alloy bars	2.70	2.70	2.70	2.70					
Structural shapes	2.10	2.10	2.10	2.10					
Stainless bars (No. 302)	24.00	24.00	24.00	24.00					
Wire and Wire Products:									
(Cents Per Lb.)									
Plain wire	2.60	2.60	2.60	2.60					
Wire nails	2.55	2.55	2.55	2.55					
Rails:									
(Dollars Per Gross Ton)									
Heavy rails	\$40.00	\$40.00	\$40.00	\$40.00					
Light rails	40.00	40.00	40.00	40.00					
Semi-Finished Steel:									
(Dollars Per Gross Ton)									
Rerolling billets	\$34.00	\$34.00	\$34.00	\$34.00					
Sheet bars	34.00	34.00	34.00	34.00					
Slabs	34.00	34.00	34.00	34.00					
Forging billets	40.00	40.00	40.00	40.00					
Alloy blooms, billets, slabs	54.00	54.00	54.00	54.00					
Wire Rods and Skelp:									
(Cents Per Lb.)									
Wire rods	2.00	2.00	2.00	2.00					
Skelp (grvd)	1.90	1.90	1.90	1.90					

†The switching charge for delivery to foundries in the Chicago district is 60c. per ton. ‡For carlots at seaboard.

Scrap:

	(Per Gross Ton)	Heavy melt'g steel, P'gh.	\$20.00	\$20.00	\$20.00
Heavy melt'g steel, Phila.	18.75	18.75	18.75	20.625	
Heavy melt'g steel, Ch'go	18.75	18.75	18.75	19.75	
No. 1 hy. comp. sheet, Det.	17.85	17.85	17.85	18.00	
Low phos. plate, Youngs'n	23.00	23.00	23.00	23.00	
No. 1 east, Pittsburgh	22.00	22.00	22.00	20.25	
No. 1 east, Philadelphia	24.00	24.00	24.00	22.25	
No. 1 cast, Ch'go*	21.00	21.00	21.00	17.75	

*Changed to gross ton basis, April 3, 1941.

Coke, Connellsville:

	(Per Net Ton at Oven)	Furnace coke, prompt	\$6.125	\$6.125	\$6.125	\$4.75
Foundry coke, prompt	..	6.875	6.875	6.875	6.875	5.25

Non-Ferrous Metals:

	(Cents per Lb. to Large Buyers)	Copper, electro., Conn.*	12.00	12.00	12.00
Copper, Lake, New York	12.00	12.00	12.00	12.00	
Tin (Straits), New York	52.00	52.00	52.00	50.25	
Zinc, East St. Louis	7.25	7.25	7.25	7.25	
Lead, St. Louis	5.70	5.70	5.70	4.85	
Antimony (Asiatic), N. Y.	16.50	16.50	16.50	16.50	

*Mine producers only.

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 118-122 herein.
On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

. . . Composite Prices

FINISHED STEEL

Sept. 23, 1941	2.30467c. a Lb.....
One week ago	2.30467c. a Lb.....
One month ago	2.30467c. a Lb.....
One year ago	2.30467c. a Lb.....

PIG IRON

..... \$23.61 a Gross Ton.....	..... \$19.17 a Gross Ton.....
..... \$23.61 a Gross Ton.....	..... \$19.17 a Gross Ton.....
..... \$23.61 a Gross Ton.....	..... \$19.17 a Gross Ton.....
..... \$22.61 a Gross Ton.....	..... \$20.29 a Gross Ton.....

SCRAP STEEL

High	Low	High	Low
1941..... 2.30467c.,	2.30467c.,	\$22.00, Jan. 7	\$19.17, Apr. 10
1940..... 2.30467c., Jan. 2	2.24107c., Apr. 16	21.83, Dec. 30	16.04, Apr. 9
1939..... 2.35367c., Jan. 3	2.26689c., May 16	22.50, Oct. 3	14.08, May 16
1938..... 2.58414c., Jan. 4	2.27207c., Oct. 18	15.00, Nov. 22	11.00, June 7
1937..... 2.58414c., Mar. 9	2.32263c., Jan. 4	23.25, Mar. 9	20.25, Feb. 16
1936..... 2.32263c., Dec. 28	2.05200c., Mar. 10	19.74, Nov. 24	18.73, Aug. 11
1935..... 2.07642c., Oct. 1	2.06492c., Jan. 8	18.84, Nov. 5	17.83, May 14
1934..... 2.15367c., Apr. 24	1.95757c., Jan. 2	17.90, May 1	16.90, Jan. 27
1933..... 1.95578c., Oct. 3	1.75836c., May 2	16.90, Dec. 5	18.56, Jan. 3
1932..... 1.89196c., July 5	1.83901c., Mar. 1	14.81, Jan. 5	13.56, Dec. 6
1931..... 1.99629c., Jan. 13	1.86586c., Dec. 29	15.90, Jan. 6	14.79, Dec. 15
1930..... 2.25488c., Jan. 7	1.97319c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16
1929..... 2.31773c., May 28	2.26498c., Oct. 29	18.71, May 14	18.21, Dec. 17

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.

Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.

PRICES

Prices of Finished Iron and Steel...

Steel prices shown here are f.o.b. basing points, in cents per lb., unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point ↓ Product	Pitts-	Chiago	Gary	Cleve-	Birm-	Buffalo	Youngs-	Spar-	Granite	Middle-	Gulf	Pacific	DELIVERED TO		
	burgh			land	ingham		town	rrows	City	town,	Ports,	Ports,	Detroit	New York	Philadel-
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled ¹	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	3.67¢
Long ternes ²	3.80¢		3.80¢									4.55¢			
STRIP															
Hot rolled ³	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢	2.46¢	
Cold rolled ⁴	2.80¢	2.90¢		2.80¢			2.80¢	(Worcester = 3.00¢)				2.90¢		3.16¢	
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢							2.56¢	
Commodity C-R	2.95¢			2.95¢			2.95¢	(Worcester = 3.35¢)				3.05¢		3.31¢	
TIN PLATE															
Standard cokes, base box	\$5.00	\$5.00	\$5.00						\$5.10						\$5.32
BLACK PLATE															
29 gage ⁵	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ (10) ⁶		3.37¢	
TERNES, M'FG.															
Special coated, base box	\$1.30	\$4.30	\$4.30						\$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			(Duluth = 2.25¢)		2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel ⁶	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢					2.50¢	2.80¢			
Reinforcing (billet) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢	2.39¢	
Reinforcing (rail) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢		2.47¢
Cold finished ⁸	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢			(Detroit = 2.70¢)				3.01¢	2.97¢	
Alloy, hot rolled	2.70¢	2.70¢				2.70¢	(Bethlehem, Massillon, Canton = 2.70¢)					2.80¢			
Alloy, cold drawn	3.35¢	3.35¢	3.35¢	3.35¢		3.35¢						3.45¢			
PLATES															
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	2.25¢ ¹¹		2.45¢	2.65¢	2.25¢	2.29¢	2.15¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	3.67¢
Alloy	3.50¢	3.50¢				(Coatesville = 3.50¢)					3.95¢	4.15¢		3.70¢	3.37¢
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	(Bethlehem = 2.10¢)			2.45¢	2.75¢		2.27¢	2.215¢	
SPRING STEEL C-R															
0.26 to 0.50 Carbon	2.80¢				2.80¢				(Worcester = 3.00¢)						
0.51 to 0.75 Carbon	4.30¢				4.30¢				(Worcester = 4.50¢)						
0.76 to 1.00 Carbon	6.15¢				6.15¢				(Worcester = 6.35¢)						
1.01 to 1.25 Carbon	8.35¢				8.35¢				(Worcester = 8.55¢)						
WIRE⁹															
Bright	2.60¢	2.60¢			2.60¢	2.60¢			(Worcester = 2.70¢)			3.10¢		2.92¢	
Galvanized	2.60¢	2.60¢			2.60¢	2.60¢			(Worcester = 2.70¢)			3.10¢		2.92¢	
Spring	3.20¢	3.20¢			3.20¢				(Worcester = 3.30¢)			3.80¢		3.52¢	
PILING															
Steel sheet	2.40¢	2.40¢					2.40¢					2.95¢		2.72¢	
IRON BARS															
Common			2.25¢						(Terre Haute, Ind. = 2.15¢)						
Wrought single refined	4.40¢														
Wrought double refined	5.40¢														

¹ Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. ² Unassorted 8-lb. coating. ³ Widths up to 12 in. ⁴ Carbon 0.25 per cent and less. ⁵ Applies to certain width and length limitations. ⁶ For merchant trade. ⁷ Straight lengths as quoted by distributors. ⁸ Also shafting. For quantities of 20,000 to 39,999 lb. ⁹ Carload lot to manufacturing trade. ¹⁰ Boxed. ¹¹ Ship plates only.

PRICES

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (rerolling only). Prices delivered Detroit are \$2 higher; f.o.b. Duluth, billets only, \$2 higher.

Per Gross Ton

Rerolling \$34.00

Forging quality 40.00

Shell Steel

Basic open hearth shell steel, f.o.b. Pittsburgh and Chicago.

Per Gross Ton

3 in. to 12 in. \$52.00

12 in. to 18 in. 54.00

18 in. and over. 56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton

Open hearth or bessemer \$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved, universal and sheared 1.90c.

Wire Rods

(No. 5 to 9/32 in.) *Per Lb.*

Pittsburgh, Chicago, Cleveland 2.00c.

Worcester, Mass. 2.10c.

Birmingham 2.00c.

San Francisco 2.50c.

Galveston 2.25c.

9/32 in. to 47/64 in., 0.15c. a lb. higher. Quantity extras apply.

Alloy Steel Blooms, Billets and Slabs

Per Gross Ton

Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem \$54.00

TOOL STEEL

(F.o.b. Pittsburgh)

Base per Lb.

High speed 67c.

High-carbon-chromium 43c.

Oil hardening 24c.

Special carbon 22c.

Extra carbon 18c.

Regular carbon 14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

PIG IRON

All prices set in bold face type are maxima established by OPACS on June 24, 1941. Other domestic prices are delivered quotations per gross ton computed on the basis of the official maxima.

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phosphorous	Charcoal
Boston.....	\$25.50	\$25.00	\$26.50	\$26.00	.....	.....
Brooklyn.....	27.50	.....	.....	28.00	.....	.....
Jersey City.....	26.53	26.03	27.53	27.03	.....	.....
Philadelphia.....	25.84	25.34	26.84	26.34	.....	.....
Bethlehem, Pa.	\$25.00	\$24.50	\$26.00	\$25.50	.....	.....
Everett, Mass.	25.00	24.50	26.00	25.50	.....	.....
Sweden, Pa.	25.00	24.50	26.00	25.50	.....	.....
Steelton, Pa.	24.50	.....	.....	.....	\$29.50	.....
Birdsboro, Pa.	25.00	24.50	26.00	25.50	29.50	.....
Sparrows Point, Md.	25.00	24.50	.....	.....	.....	.....
Erie, Pa.	24.00	23.50	25.00	24.50	.....	.....
Neville Island, Pa.	24.00	23.50	24.50	24.00	.....	.....
Sharpsville, Pa.*	24.00	23.50	24.50	24.00	.....	.....
Buffalo.....	24.00	23.00	25.00	24.50	29.50	.....
Cincinnati.....	24.44	24.61	.....	25.11	.....	.....
Canton, Ohio.....	25.39	24.89	25.89	25.39	.....	.....
Mansfield, Ohio.....	25.94	25.44	26.44	25.94	.....	.....
St. Louis.....	24.50	24.02	.....	.....	.....	.....
Chicago.....	24.00	23.50	24.50	24.00	.....	\$31.34
Granite City, Ill.	24.00	23.50	24.50	24.00	.....	.....
Cleveland.....	24.00	23.50	24.50	24.00	.....	.....
Hamilton, Ohio.....	24.00	23.50	.....	24.00	.....	.....
Toledo.....	24.00	23.50	24.50	24.00	.....	.....
Youngstown*	24.00	23.50	24.50	24.00	.....	.....
Detroit.....	24.00	23.50	24.50	24.00	.....	.....
Lake Superior fe. ....	.....	.....	.....	.....	\$28.00	.....
Lyles, Tenn. fe.† ....	.....	.....	27.13	26.63	.....	33.00
St. Paul.....	26.63	.....	.....	.....	.....	.....
Duluth.....	24.50	.....	25.00	24.50	.....	.....
Birmingham.....	20.38	19.00	25.00	.....	.....	.....
Los Angeles.....	27.50	.....	.....	.....	.....	.....
San Francisco.....	27.50	.....	.....	.....	.....	.....
Seattle.....	27.50	.....	.....	.....	.....	.....
Provo, Utah.....	22.00	.....	.....	.....	.....	.....
Montreal.....	27.50	27.50	.....	28.00	.....	.....
Toronto.....	25.50	25.50	.....	26.00	.....	.....

GRAY FORGE IRON

Valley or Pittsburgh furnace \$23.50

*Pittsburgh Coke & Iron Co. (Sharpsville, Pa., furnace only) and the Struthers Iron and Steel Co., Struthers, Ohio, may charge 50c. a ton in excess of basing point prices for No. 2 foundry, basic, bessemer and malleable.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.25 per cent silicon content in excess of base grade (1.75 per cent to 2.25 per cent).

Phosphorous Differential: Basing point prices are subject to a reduction of 38c. per ton for phosphorous content of 0.70 per cent and over.

† Price shown is for low-phosphorous iron; high-phosphorous sells for \$28.50 at the furnace.

Manganese Differentials: Basing point prices are subject to an additional charge not to exceed 50c. a ton for each 0.50 per cent manganese content in excess of 1.00 per cent.

WAREHOUSE PRICES

Pitts- burgh	Chi- cago	Cleve- land	Phi- ladel- phia	New York	Detroit	Buffalo	Bos- ton	Birm- ingham	St. Louis	St. Paul	Mil- waukee	Los Angeles	
Sheets, hot rolled.....	\$3.35	\$3.25	\$3.35	\$3.75	\$3.58	\$3.43	\$3.25	\$3.71	\$3.45	\$3.39	\$3.30	\$3.38	\$5.10
Sheets, cold rolled.....	4.10	4.05	4.05	4.60	4.30	4.30	3.68	.....	4.24	4.35	4.23	4.23	7.30
Sheets, galvanized.....	4.65	4.85	4.75	5.00	5.00	4.84	4.75	5.11	4.75	4.99	4.75	4.98	6.30
Strip, hot rolled.....	3.60	3.60	3.50	3.95	3.96	3.68*	3.82	4.06	3.70	3.74	3.65	3.73	.....
Strip, cold rolled.....	3.20	3.50	3.20	3.31	3.51	3.40	3.52	3.46	.....	3.61	3.83	3.54	.....
Plates.....	3.40	3.55	3.40	3.75	3.76	3.60	3.62	3.85	3.55	3.69	3.80	3.68	4.95
Structural shapes.....	3.40	3.55	3.58	3.75	3.75	3.65	3.40	3.85	3.55	3.69	3.80	3.68	4.95
Bars, hot rolled.....	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.64	3.75	3.63	**4.15
Bars, cold finished.....	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300.....	7.45	7.35	7.55	7.31	7.60	7.67	7.35	7.50	.....	7.72	7.45	7.58	10.35
Bars, ht. rld. SAE 3100.....	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	.....	6.02	6.00	5.88	9.35
Bars, ed. drn. SAE 2300.....	8.40	8.40	8.40	8.56	8.84	8.70	8.40	8.63	.....	8.77	8.84	8.63	11.35
Bars, ed. drn. SAE 3100.....	6.75	6.75	7.75	7.16	7.19	7.05	6.75	7.23	.....	7.12	7.44	6.98	10.35

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb., galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb., cold rolled strips, 0.071 in. thick; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb., cold rolled strip 0.095 in. and lighter; Milwaukee, cold rolled sheets, 400 to 1499 lb.; New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, cold rolled sheets, 300 to 1999 lb., galvanized sheets, 24 ga.—1 to 1499 lb. Extras for size, quality, etc., apply on above quotations.

*12 gage and heavier, \$3.43. **Over 4 in. wide and over 1 in. thick, \$4.95.

PRICES

CORROSION AND HEAT-RESISTING STEELS

(Per lb. base price, f.o.b. Pittsburgh)

Chromium-Nickel Alloys

	No. 304	No. 302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium Alloys

	No. 410	No. 430	No. 442	No. 446
F.Billets	15.73c.	16.15c.	19.13c.	23.38c.
Bars	18.50c.	19.00c.	22.50c.	27.50c.
Plates	21.50c.	22.00c.	25.50c.	30.50c.
Sheets	26.50c.	29.00c.	32.50c.	36.50c.
Hotstrip	17.00c.	17.50c.	24.00c.	25.00c.
Cold st.	22.00c.	22.50c.	32.00c.	52.00c.

Chromium-Nickel Clad Steel (20%)

	No. 304
Plates	18.00c.*
Sheets	19.00c.

*Includes annealing and pickling.

ELECTRICAL SHEETS

(Base, f.o.b. Pittsburgh)

	Per lb.
Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
*Motor	4.95c.
*Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 75c. per 100 lb.

*In some instances motor grade is referred to as dynamo grade and dynamo grade is referred to as dynamo special.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh, per Package of 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C...	\$6.00	\$12.00
15-lb. coating I.C...	7.00	14.00
20-lb. coating I.C...	7.50	15.00
25-lb. coating I.C...	8.00	16.00
30-lb. coating I.C...	8.63	17.25
40-lb. coating I.C...	9.75	19.50

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and Carriage Bolts:	
6 1/2 in., shorter and smaller	65 1/2
6 x 5/8 in., and shorter	63 1/2
6 in. by 3/4 to 1 in. and shorter	.61
1 1/2 in. and larger, all length	.59
All diameters over 6 in. long	.59
Lag, all sizes	.62
Plow bolts	.65

Nuts, Cold Punched or Hot Pressed:

(hexagon or square)

1/2 in. and smaller	.62
9/16 to 1 in. inclusive	.59
1 1/8 to 1 1/2 in. inclusive	.57
1 1/8 in. and larger	.56

On above bolts and nuts, excepting plow bolts, additional allowance of 10 per cent for full container quantities. There is an additional 5 per cent allowance for carload shipments.

Semi-Fin. Hexagon Nuts	U.S.S.	S.A.E.
7/16 in. and smaller	..	64
1/2 in. and smaller	62	..
1/2 in. through 1 in.	60	..
9/16 to 1 in.	59	..
1 1/8 in. through 1 1/2 in.	57	58
1 1/8 in. and larger	56	..

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose	71 and 10
Stove bolts in packages, with nuts attached	71
Stove bolts in bulk	80

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York lots of 200 lb. or over.

Large Rivets	(1/2 in. and larger)
	Base per 100 Lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	\$3.75
	Per Cent Off List

Small Rivets	(7/16 in. and smaller)
	Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham	65 and 5
	Base per Keg

Cap and Set Screws	Per Cent Off List
Upset hex. head cap screws U.S.S. or S.A.E. thread, 1 in. and smaller	60
Upset set screws, cup and oval points	68
Milled studs	40
Flat head cap screws, listed sizes	30
Filister head cap, listed sizes	46

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

WIRE PRODUCTS

(To the trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

Base per Keg

Standard wire nails	\$2.55
Coated nails	2.55
Cut nails, carloads	3.85

Base per 100 Lb.

Annealed fence wire	\$3.05
	Base Column

Woven wire fence*	67
Fence posts (carloads)	69

Single loop bale ties	59
Galvanized barbed wire†	70

Twisted barbless wire	70
-----------------------	----

*15 1/2 gage and heavier. †On 80-rod spools in carload quantities.

Note: Birmingham base same on above items, except spring wire.

BOILER TUBES

Seamless Steel and Lap Weld Commercial Boiler Tubes and Locomotive Tubes.

Minimum Wall

(Net base prices per 100 ft., f.o.b. Pittsburgh, in carload lots)

Lap

Seamless Weld,

Cold Hot Hot

Drawn Rolled Rolled

\$ \$ \$

2 in. o.d. 13 B.W.G. 15.03 13.04 12.38

2 1/2 in. o.d. 12 B.W.G. 20.21 17.54 16.58

3 in. o.d. 12 B.W.G. 24.48 19.50 18.35

3 1/2 in. o.d. 11 B.W.G. 28.37 24.62 23.15

4 in. o.d. 10 B.W.G. 35.20 30.54 28.66

(Extras for less carload quantities)

40,000 lb. or ft. over

30,000 lb. or ft. to 39,999 lb. or ft. 5%

20,000 lb. or ft. to 29,999 lb. or ft. 10%

10,000 lb. or ft. to 19,999 lb. or ft. 20%

5,000 lb. or ft. to 9,999 lb. or ft. 30%

2,000 lb. or ft. to 4,999 lb. or ft. 45%

Under 2,000 lb. or ft. 65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills
(f.o.b. Pittsburgh only on wrought pipe)

Base Price = \$200 Per Net Ton

Steel (Butt Weld)

Black Galv.

1/2 in. 63 1/2 51

3/4 in. 66 1/2 55

1 to 3 in. 68 1/2 57 1/2

Wrought Iron (Butt Weld)

1/2 in. 24 3 1/2

3/4 in. 30 10

1 and 1 1/4 in. 34 16

1 1/2 in. 38 18 1/2

2 in. 37 1/2 18

Steel (Lap Weld)

2 in. 61 49 1/2

2 1/2 and 3 in. 64 52 1/2

3 1/2 to 6 in. 66 1/2 56

Wrought Iron (Lap Weld)

2 in. 30 1/2 12

2 1/2 to 3 1/2 in. 31 1/2 14 1/2

4 in. 33 1/2 18

4 1/2 to 8 in. 32 1/2 17

Steel (Butt, extra strong, plain ends)

Black Galv.</

STOPPED BEARING FAILURES... PRODUCTION DELAYS *with* SUN H. D. LUBRICANTS

ANOTHER STEP TO A HIGHER P-Q*

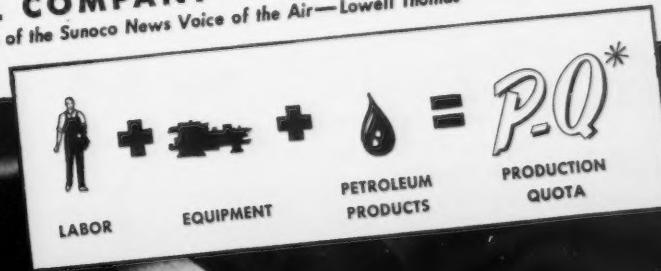
Labor, equipment and the right lubricants all functioning at their best is the first step toward increased production—toward the setting of a higher Production Quota (P-Q*).

This was conclusively proved in a large Eastern Rubber Mill. Bearings on large mixers were constantly failing... "time-outs" for repairs were crippling production. Many lubricants and many types of bearings were tried... all failed to stand up under operating temperatures of 240° F. and pressures of a quarter of a million pounds per square inch.

Then, after a survey by those "doctors of industry"—SUN Oil Engineers—a switch was made to SUN Heavy Duty Lubricants. The problem was solved! There hasn't been a bearing failure since... production delays have stopped... and a new P-Q* has been set by plant engineers.

Is the P-Q* of your plant as high as it should be? Can these modern, heavy-duty lubricants help you eliminate delays in your plant... step up production... and permit the setting of a higher P-Q*? Get the answers today, write...

SUN OIL COMPANY • PHILADELPHIA
Sponsors of the Sunoco News Voice of the Air—Lowell Thomas



PETROLEUM PRODUCTS FOR ALL INDUSTRIES

PRICES

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia,
Baltimore, Mobile or New
Orleans, Domestic, 80%,
per gross ton (carloads) ... \$120.00

Spiegeleisen

(Per Gross Ton Furnace)
Domestic, 19 to 21% \$36.00
Domestic, 26 to 28% 49.50

Electric Ferrosilicon

(Per Gross Ton, Delivered Lump Size)
50% (carload lots, bulk) \$74.50*
50% (ton lots, packed) 87.00*
75% (carload, lots, bulk) 135.00*
75% (ton lots, packed) 151.00*

Silvery Iron

(Per Gross Tons, base 6.00 to 6.50 \$)
F.O.B. Jackson, Ohio \$29.50*
Buffalo \$30.75*

For each additional 0.50% silicon add
\$1 a ton. For each 0.50% manganese over
1% add 50c. a ton. Add \$1 a ton for
0.75% phosphorous or over.

* Official OPACS price established June
24.

Bessemer Ferrosilicon

Prices are \$1 a ton above Silvery Iron
quotations of comparable analysis.

Ferrochrome

(Per Lb. Contained Cr, Delivered Carlots,
Lump Size, on Contract)
4 to 6 carbon 11.00c.
2 carbon 17.50c.
1 carbon 18.50c.
0.10 carbon 20.50c.
0.06 carbon 21.00c.

Spot prices are 1/4c. per lb. of contained
chromium higher.

Silico-Manganese

(Per Gross Ton, Delivered, Lump Size,
Bulk, on Contract)
3 carbon \$113.00*
2.50 carbon 118.00*
2 carbon 123.00*
1 carbon 133.00*

Other Ferroalloys

Ferrotungsten, per lb. con-
tained W, del'd carload \$2.00
Ferrotungsten, 100 lb. and less \$2.25
Ferrovanadium, contract, per
lb. contained V, del'd \$2.70 to \$2.90†
Ferrocolumbium, per lb. con-
tained Cb, f.o.b. Niagara
Falls, N. Y., ton lots \$2.25†
Ferrocobaltitanium, 15-18 Ti,
7-8 C, f.o.b. furnace, carload,
contract, net ton \$142.50
Ferrocobaltitanium, 17-20 Ti,
3-5 C, f.o.b. furnace, carload,
contract, net ton \$157.50

Ferrophosphorus, electric or
blast furnace material, car-
loads, f.o.b. Anniston, Ala.,
for 18%, with \$3 unitage
freight, equalized with Rock-
dale, Tenn., gross ton \$58.50

Ferrophosphorus, electrolytic
23-26%, carlots, f.o.b. Mon-
santo (Siglo), Tenn., \$3 unit-
age, freight equalized with
Nashville, gross ton \$75.00

Ferromolybdenum, per lb. Mo,
f.o.b. furnace 95c.

Calcium molybdate, per lb.
Mo, f.o.b. furnace 80c.

Molybdenum oxide briquettes
48-52 Mo, per lb. contained
Mo, f.o.b. Langeth, Pa.
Molybdenum oxide, in cans, per
lb. contained Mo, f.o.b. Wash-
ington, Pa.

*Spot prices are \$5 per ton higher.
†Spot prices are 10c. per lb. of con-
tained element higher.

ORES

Lake Superior Ores (51.50% Fe.)

(Delivered Lower Lake Ports)

Per Gross Ton
Old range, bessemer, 51.50.... \$4.75
Old range, non-bessemer, 51.50 ... 4.60
Mesaba, bessemer, 51.50..... 4.60
Mesaba, non-bessemer, 51.50... 4.45
High phosphorus, 51.50..... 4.35

Foreign Ores*

(C.i.f. Philadelphia or Baltimore,
Exclusive of Duty)

Per Unit

African, Indian, 44-48 Mn .. 65c. to 66c.
African, Indian, 49-51 Mn .. 67c. to 69c.

Brazilian, 46-48 Mn..... 65c.
Cuban, del'd, 51 Mn 79c. to 81c.

Per Short Ton Unit

Tungsten, Chinese Wolframite,
duty paid, delivered.... \$24 to \$26
Tungsten, domestic scheelite, at
mine \$24.00

Chrome ore, lump, c.i.f. Atlantic
Seaboard, per gross ton; South
African (low grade) Nom.
Rhodesian, 45 \$32.00
Rhodesian, 48 \$39.00-\$40.00

*Imports no longer readily avail-
able. Prices shown are nominal.

COKE

Furnace

Per Net Ton

Connellsville, prompt ... \$6.00 to \$6.25

Foundry

Connellsville, prompt ... \$6.75 to \$7.00
By-product, Chicago \$10.50
By-product, New England.... \$13.75

By-product, Newark.. \$12.40 to \$12.95
By-product, Philadelphia \$12.13
By-product, Cleveland \$12.30
By-product, Cincinnati \$11.75
By-product, Birmingham \$8.50
By-product, St. Louis. \$10.75 to \$11.00

RAILS, TRACK SUPPLIES

(F.o.b. Mill)

Standard rails, heavier than 60
lb., gross ton \$40.00
Angle bars, 100 lb. 2.70

(F.o.b. Basing Points) Per Gross Ton
Light rails (from billets).... \$40.00
Light rails (from rail steel) ... 39.00

Base per Lb.

Cut spikes 3.00c.
Screw spikes 5.15c.
Tie plates, steel 2.15c.
Tie plates, Pacific Coast 2.30c.
Track bolts, heat treated, to
railroads 5.00c.
Track bolts, jobbers discount.. 63-5

Basing points, light rails—Pittsburgh,
Chicago, Birmingham; spikes and tie
plates—Pittsburgh, Chicago, Portsmouth,
Ohio, Weirton, W. Va., St. Louis, Kansas
City, Minnequa, Colo., Birmingham and
Pacific Coast ports; tie plates alone—
Steelton, Pa., Buffalo; spikes alone—
Youngstown, Lebanon, Pa., Richmond, Va.

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5
f.o.b. Kentucky and Illinois
mines, all rail.... \$22.00 to \$23.00
Domestic, f.o.b. Ohio River land-
ing barges 22.00 to 23.00
No. 2 lump, 85-5 f.o.b. Kentucky
and Illinois mines.... 22.00 to 23.00
Foreign, 85% calcium fluoride,
not over 5% Si, c.i.f. Atlantic
ports, duty paid..... Nominal
Domestic No. 1 ground bulk, 96
to 98%, calcium fluoride, not
over 2 1/2% silicon, f.o.b. Illi-
nois and Kentucky mines.... 31.00
As above, in bags, f.o.b. same
mines 32.60

REFRACTORIES

(F.o.b. Works)

Fire Clay Brick Per 1000
Super-duty brick, St. Louis... \$64.60
First quality, Pennsylvania,
Maryland, Kentucky, Missouri
and Illinois 51.30
First quality, New Jersey.... 56.00
Second quality, Pennsylvania,
Maryland, Kentucky, Missouri,
and Illinois 46.55
Second quality, New Jersey.... 51.00
No. 1, Ohio 43.00
Ground fire clay, net ton..... 7.60

Silica Brick

Pennsylvania \$51.30
Chicago District 58.90
Birmingham 51.30
Silica cement, net ton (Eastern) 9.00

Chrome Brick Per Net Ton

Standard, f.o.b. Baltimore, Plym-
outh Meeting and Chester.... \$54.00
Chemically bonded, f.o.b. Balti-
more, Plymouth Meeting and
Chester, Pa. 54.00

Magnesite Brick

Standard f.o.b. Baltimore and
Chester \$76.00
Chemically bonded, f.o.b. Balti-
more 65.00

Grain Magnesite

Domestic, f.o.b. Baltimore and
Chester in sacks \$44.00
Domestic, f.o.b. Chewelah, Wash.
(in bulk) 22.00



Molybdenum Irons
give you top
performance at
bed rock price

With reputations depending on performance, Diesel engine builders take no chances in selecting materials. Hence the widespread use of Molybdenum irons for such vital parts as cylinder heads, liners and pistons where heat resistance, as well as strength and wearing quality, is demanded.

Molybdenum in combination with chromium makes gray iron highly resistant to growth and cracking, gives good wear resistance and strength—all at comparatively low cost.

Write for our free technical book "Molybdenum in Cast Iron" for detailed, helpful data.

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Climax Molybdenum Company
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SALES POSSIBILITIES

... CONSTRUCTION, PLANT EXPANSION AND EQUIPMENT BUYING

North Atlantic States

• **Bridgeport Rolling Mills Co.**, Bruce and Stratford Avenues, Bridgeport, Conn., brass and bronze products, plans one-story addition. Cost about \$100,000 with equipment. Production will be for government and fund will be secured through that source.

United States Rubber Co., Inc., Naugatuck Chemical Division, Naugatuck, Conn., synthetic rubber, etc., will begin superstructure soon for new one and multi-story mill near present works for production for government. Fund of \$1,250,000, originally granted by Defense Plant Corp., Washington, for buildings and machinery will be increased. Contract has been let to Blaw-Knox Corp., Pittsburgh, for certain processing machinery and contracts for miscellaneous equipment will be made soon. Fletcher-Thompson, Inc., 1336 Fairfield Avenue, Bridgeport, is architect and engineer. Main offices of parent company are in New York.

United Aircraft Corp., Pratt & Whitney Division, East Hartford, Conn., has let general contract to Turner Construction Co., 420 Lexington Avenue, New York, for two-story addition to engineering building and for two one-story testing structures. Cost over \$85,000 with equipment. Albert Kahn Associated Architects and Engineers, Inc., Detroit, is architect and engineer.

Board of Education, New Haven, Conn., has engaged R. W. Foote, 157 Church Street, and Howard Sullivan, 1399 Chapel Street, architects, to prepare plans for new multi-story trade and vocational school, for which State Legislature has authorized fund of \$750,000.

Meisel Gear Co., an interest of Meisel Press Mfg. Co., 944 Dorchester Avenue, Boston, cut gears, printing machinery and parts, has engaged Cleverdon, Varney & Pike, 46 Cornhill Street, engineers, to prepare plans for new one-story plant for production of aircraft parts for government. Appropriation of \$1,682,500 has been authorized by Defense Plant Corp., Washington.

Linde Air Products Co., Inc., 30 East Forty-second Street, New York, has let general contract to Oeschwald Construction Co., 854 Clinton Avenue, Newark, N. J., for one-story addition to branch plant at Linden, N. J., including alterations and improvements in present structure. Cost about \$45,000.

Eppenbach, Inc., 45-10 Vernon Boulevard, Long Island City, operating a pattern machinery works, has leased one-story building at 5-30 Forty-seventh Avenue for expansion.

American Can Co., 230 Park Avenue, New York, has let general contract to Norris Construction Co., 59 East Van Buren Street, Chicago, for new branch plant on South Kingshighway, St. Louis, where about 30 acres recently was acquired. It will consist of main one-story production unit, 620 x 1035 ft., with two adjoining structures, 100 x 375 ft. and 50 x 175 ft., for machine shop and general service, and for offices. Cost about \$2,000,000 with equipment. Present St. Louis plant at 41 Branch Street will be removed to new works on completion. C. G. Preis, first noted address, is company architect and engineer.

New York Central Railroad Co., 466 Lexington Avenue, New York, F. S. Austin, purchasing agent, asks bids until Sept. 30 for axles, nails, chilled iron wheels, conduit, pipe, insulated magnet wire, track bonds, roller bearings, and other equipment.

Virginia Dare Extract Co., 882 Third Avenue, Brooklyn, wines and beverages, plans new one-story plant on State Highway 25, Linden, N. J., for general production, mechanical bottling, storage and distribution. Cost over \$70,000 with equipment. J. J. Gloster & Co., 303 West Forty-second Street, New York, are architects and engineers.

Irving Air Chute Co., 1670 Jefferson Avenue, Buffalo, parachutes and aircraft equipment, has taken over a two-story building, about

29,000 sq. ft. of floor space, at 508 West Main Street, Lexington, Ky., for new branch plant. Contract has been let to Perry Lumber Co., 246 Walton Avenue, Lexington, for remodeling.

National Carbon Co., 2625 Highland Avenue, Niagara Falls, N. Y., has let general contract to Scufari Construction Co., 825 Fifteenth Street, for two one-story additions to carbon and graphite plant, about 90 x 450 ft., and 134 x 210 ft., comprising part of expansion to be carried out at plant. Cost close to \$350,000 with equipment.

Foster-Wheeler Corp., Dansville, N. Y., oil refining and other processing machinery and parts, is erecting two-story addition, 40 x 50 ft., for expansion. Cost close to \$45,000 with equipment. Main offices are at 165 Broadway, New York.

National Grinding Wheel Co., Inc., North Tonawanda, N. Y., has let general contract to Laur & Mack, 1400 College Avenue, Niagara Falls, N. Y., for two-story addition, about 40 x 120 ft. Cost close to \$50,000 with equipment.

Rangertone, Inc., 201 Verona Avenue, Newark, N. J., electric signal devices, radio equipment, etc., has purchased three-story building at 67-73 Winthrop Street for expansion.

Heyden Chemical Corp., 290 River Road, Garfield, N. J., has let general contract to J. H. Steele & Sons, Inc., 48 North Second Street, Paterson, N. J., for one story and basement addition, 50 x 100 ft., and two-story extension, 40 x 40 ft., for expansion in production, storage and distributing departments. Cost over \$50,000 with equipment. Arthur Haenick, 349 Ninth Avenue, Paterson, is architect.

Commanding Officer, Ordnance Department, Picatinny Arsenal, near Dover, N. J., asks bids until Sept. 29 for twist drills (Circular 519); until Sept. 30 for reamers (Circular 510), and copper gaskets (Circular 522).

Keuffel & Esser Co., 300 Adams Street, Hoboken, N. J., surveying and other technical instruments, has leased one-story building at Third and Jefferson Streets for expansion.

Okonite Co., Canal Street, Passaic, N. J., insulated wire and cables, has let general contract to F. L. Dillen Construction Co., 75 Church Street, Lodi, N. J., for two-story addition, 60 x 140 ft. Cost close to \$75,000 with equipment.

State Purchase Commissioner, Albert G. Waters, Room 318, State House, Trenton, N. J., asks bids until Sept. 29 for guard rail fittings, sluice gates, copper gutter and hanger, etc.

Atlantic Sheet Metal Works, Inc., 253 Jefferson Street, Newark, N. J., sheet metal products, has leased one-story building, about 16,000 sq. ft. of floor space, to be erected by D. O. Evans, 1445 North Broad Street, at Hillside, for manufacture of bins, racks and kindred specialties for Army. Cost close to \$40,000 with equipment.

Board of Public Education, Administration Building, Parkway and Twenty-first Streets, Philadelphia, A. B. Anderson, secretary and business manager, asks bids until Sept. 29 for ventilating system for welding shop, chain link fence, and other equipment.

E. W. Twitchell, Inc., Third and Somerset Streets, Philadelphia, twisted, molded and other processed paper products, has let general contract to Industrial Constructors Co., Broad Street and Allegheny Avenue, for new two-story plant, 60 x 120 ft., at Maple Shade, Burlington County, N. J. Cost close to \$50,000 with equipment.

Department of Public Works, Bureau of Water, City Hall Annex, Philadelphia, John H. Neeson, director, asks bids until Oct. 8 for six horizontal centrifugal motor-driven pumping units and accessories, four units each to consist of two pumps with ratings of 40,-

000,000 and 30,000,000 gal. per day, respectively, and two units with rating of 25,000,000 gal. per day each, all for Lardner's Point pumping station.

Pittsburgh-Corning Glass Corp., Grant Building, Pittsburgh, has let general contract to H. K. Ferguson Co., Hanna Building, Cleveland, for one-story addition to plant at Port Allegany, Pa. Cost close to \$160,000 with equipment.

American Hollow Boring Co., West Nineteenth Street, Erie, Pa., hollow-bored forgings, steel shafting, etc., has let general contract to Sessinghaus & Ostergaard, Inc., 1115 Peach Street, for one-story addition, 60 x 120 ft., for storage and distribution. Cost close to \$40,000 with equipment. Myers & Johnson, 821 Commerce Street, are architects.

General Purchasing Officer, Panama Canal, Washington, asks bids until Sept. 29 for one portable ventilating set, 1000 cu. ft. per min. capacity, with 150 ft. of 3-in. i.d. metallic flexible hose (Schedule 5530).

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 30 for diesel engine electric locomotive (Schedule 8715), low-lift elevating trucks (Schedule 8679); until Oct. 2, welding rods and electrodes (Schedule 8683), motor-driven horizontal bending roll (Schedule 8660) for Eastern and Western Navy yards.

The South

• **Bureau of Yards and Docks**, Navy Department, Washington, plans new shipyard in Berkeley district, on 40-ft. main channel of Elizabeth River, Norfolk, Va., where about 30 acres has been selected, including property now occupied by Norfolk Marine Railway Corp. plant and adjoining land. Plant will be used for rebuilding, repairing and modernization of vessels for government, and will include a 120,000-ton floating drydock, about 600 ft. long, wet basins for four 500-ft. vessels at one time, piers, wharves, machine shops, structural and woodworking shops, power station and other structures. Cost about \$5,000,000 with equipment. Appropriation in that amount has been authorized.

George Wiedemann Brewing Co., Inc., 601 Columbia Street, Newport, Ky., has let general contract to Fisher-DeVore Construction Co., 3629 Idlewild Avenue, Cincinnati, for one-story addition, about 92 x 115 ft., for storage and distribution. Cost close to \$60,000 with equipment. W. W. and W. A. Cordes, 800 Broadway, Cincinnati, are architects.

Board of Education, Baton Rouge, La., John E. Cox, superintendent, plans addition to trade school for machine shop, welding shop, sheet metal shop and electrical shop. Fund of \$34,326 has been secured through Federal aid for equipment purchases.

Kentucky Utilities Co., West Main Street, Lexington, Ky., has applied to United States Engineer Office, Cincinnati, for permission to construct river facilities for new steam-electric generating station at Tyrone, including discharge flume, water intake crib house, coal-unloading and handling plant and pile moorings. Cost close to \$4,000,000, including transmission line extensions. Sargent & Lundy, Inc., 140 South Dearborn Street, Chicago, is consulting engineer.

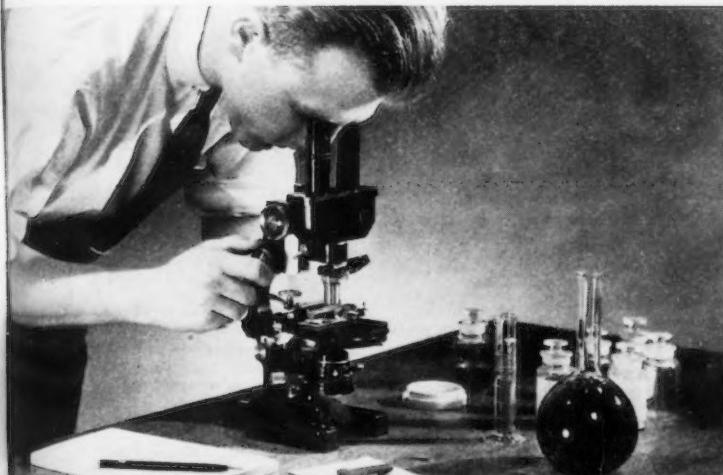
E. I. du Pont de Nemours & Co., Smokeless Powder Division, Nemours Building, Wilmington, Del., has contracted with War Department for construction of new plant near Choteau, Okla., for production of smokeless powder, with nitric acid production and concentration units, sulphuric acid units, nitro-cellulose manufacturing department and other units; also storage and distribution buildings, power house, machine shop, pumping station and auxiliary structures. Cost close to \$60,000,000, of which over \$14,000,000 will be expended for equipment. Fund in amount noted will be se-

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cured through Defense Plant Corp., Washington.

Humble Oil & Refining Co., Humble Building, Houston, Tex., plans pumping station and auxiliary structures for pressure maintenance service in Lovell Lake oil field area, near Nederland, Jefferson County, Tex. Cost close to \$350,000 with machinery.

Central States

• **Westinghouse Electric & Mfg. Co.**, East Pittsburgh, has taken over former one-story forge shop of Garford Motor Co., Lima, Ohio, and will remodel for new plant unit. Cost close to \$100,000 with equipment.

Eaton Mfg. Co., 739 East 140th Street, Cleveland, automotive equipment, plans expansion for production of aircraft engine parts and engine valves for government. Funds of \$116,580 and \$173,950 will be secured through Defense Plant Corp., Washington, for purchase of machinery for respective branches of manufacture noted.

Cleveland Automatic Machine Co., 2269 Ashland Road, Cleveland, metal-working machinery and parts, is erecting one-story addition, about 12,000 sq. ft. of floor space, for expansion in assembling department. C. B. Rowley & Associates, Keith Building, are architects and engineers.

Clark Grave Vault Co., 375 East Fifth Avenue, Columbus, Ohio, steel vaults, etc., has let general contract to Leo E. Ruisinger, 851 Frebis Street, for new two-story plant, 76 x 345 ft. Cost over \$250,000 with equipment.

Central Ohio Light & Power Co., Findlay, Ohio, has approved plans for expansion in Woodcock steam-electric generating station at Bluffton, Ohio, with installation of new 7500-kw. turbine-generating unit and auxiliary equipment. Cost over \$450,000 with equipment.

Firestone Tire & Rubber Co., Akron, Ohio, will begin superstructure for new one and multi-story mill for production of synthetic rubber for government, for which fund of \$1,250,000 was authorized by Defense Plant Corp., Washington, which will increase this amount to provide for capacity of 10,000 tons per annum, instead of 2500 tons, as initially arranged. Award for processing machinery has been made to Blaw-Knox Corp., Pittsburgh, and contracts for other equipment will be placed soon.

National Bronze & Aluminum Foundry Co., East Eighty-eighth Street and Laisy Avenue, Cleveland, has let general contract to Boldt-Rapp Co., 4404 Pershing Avenue, for one-story addition. Cost close to \$50,000 with equipment.

American Smelting & Refining Co., Indianapolis Boulevard, Whiting, Ind., has asked bids on general contract for one-story addition. Cost close to \$90,000 with equipment. Main offices are at 120 Broadway, New York.

C. Nelson Mfg. Co., 4016 North Union Boulevard, St. Louis, electric refrigerating equipment, etc., has let general contract to John B. Gutmann Construction Co., 4930 Reber Place, for one-story addition. Cost close to \$45,000 with equipment.

Miners Chemical Works, Inc., Kenneth A. Spencer, Dwight Building, Kansas City, Mo., head, recently organized, has contracted with War Department, Washington, for operation of new plant to be built by government on 1900-acre tract near Crestline, Kan., fronting on line of Missouri-Kansas-Texas Railway. Plant will be built under direction of Constructing Quartermaster, Seventh Corps Area, Omaha, Neb., for production of synthetic ammonia. It will consist of one and multi-story buildings for general production, processing, storage and distribution, with power house, machine shop and other units. Cost close to \$20,000,000. Appropriation in that amount has been arranged.

Chevrolet Motor Division, General Motors Corp., Flint, Mich., has let general contract to Henry C. Weber Construction Co., Bay City,

Mich., for one-story addition to branch plant at Bay City, 224 x 243 ft. Cost over \$500,000 with equipment. Albert Kahn Associated Architects & Engineers, Inc., Detroit, is architect and engineer.

United States Engineer Office, Washington, Maj. Gen. Julian L. Schley, chief of engineers, plans new hydroelectric power plant in vicinity of locks at St. Mary's Falls, near Sault Ste. Marie, Mich., to replace existing obsolete station. Cost about \$3,500,000 with transmission lines, power substations and other facilities. War Department is arranging appropriation in that amount. Later another hydroelectric power development is planned at same place, to cost approximately \$6,500,000.

Fruehauf Trailer Co., 10940 Harper Avenue, Detroit, motor trailers and parts, plans new plant, with main unit about 150 x 1500 ft., at Kansas City, Mo., for production of semi-trailers and equipment for government, supplementing present plant at Funston and Chrysler Roads, Fairfax district, same city. Cost over \$1,500,000 with equipment.

Ford Motor Co., Dearborn, Mich., plans one-story foundry addition for production of steel castings. Cost over \$100,000 with equipment. Giffels & Vallet, Inc., and L. Rossetti, Marquette Building, Detroit, are architects and engineers.

Department of Public Works and Buildings, Springfield, Ill., W. A. Rosenfeld, director, has let general contract to Kinnare Corp., 2816 West Monroe Street, Chicago, for new one-story machine shop, 140 x 280 ft., at Crawford Avenue and 159th Street, Chicago. Cost about \$250,000 with equipment. C. Herrick Hammond, 160 North LaSalle Street, Chicago, is architect.

American Machine & Metals, Inc., East Moline, Ill., machinery, parts, etc., plans expansion for production of anti-aircraft gun mountings for government. Fund of \$240,000 has been secured through Defense Plant Corp., Washington, for equipment.

Charles Bruning Co., 4700 West Montrose Avenue, Chicago, precision drafting instruments and kindred specialties, has asked bids on general contract for two-story addition. Cost over \$80,000 with equipment. Victor L. Charn, 141 West Jackson Boulevard, is architect.

Milwaukee Road, Union Station, Chicago, has work under way on one-story addition, 40 x 110 ft., to engine house at Green Bay, Wis., for which general contract recently was let to E. H. Regal Construction Co., 136 South Adams Street, Green Bay. Cost over \$60,000 with equipment.

John Morrell & Co., Inc., Ottumwa, Iowa, meat packer, plans new eight-story factory branch, storage and distributing plant, 60 x 120 ft., at Sioux Falls, S. D. Cost over \$150,000 with equipment.

John Deere Plow Co., Waterloo, Iowa, has let general contract to Jens Oleson & Sons Construction Co., 321 West Eighteenth Street, for two one-story additions. Cost close to \$85,000 with equipment.

Kurth Malting Co., West Burnham and South Forty-third Streets, West Milwaukee, has let general contract to Jezo Construction Co., 7232 West Greenfield Avenue, West Allis, Wis., for five-story addition, 55 x 115 ft. Cost over \$125,000 with equipment. Lawrence E. Peterson, 312 East Wisconsin Avenue, Milwaukee, is engineer.

City Council, Windom, Minn., asks bids until Sept. 29 for new turbine-generator unit and accessories, condenser and auxiliary apparatus for municipal power plant. Rose & Harris, Essex Building, Minneapolis, Minn., are consulting engineers.

Western States

• **Vega Airplane Co.**, 2555 North Hollywood Way, Burbank, Cal., has plans by John and Donald B. Parkinson, Title Insurance Building, Los Angeles, architects, for four one-

story additions, including hangar. This is part of expansion to be carried out for production for government, for which fund of \$1,822,700 has been secured through Defense Plant Corp., Washington.

Seattle-Tacoma Shipbuilding Co., 2400 Eleventh Avenue, S. W., Seattle, has let general contract to Isaacson Iron Works, 2917 East Marginal Way, for one-story addition for storage and distribution. Cost about \$80,000 with equipment.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 30 for about 80,000 ft. of nickel-alloy copper tubing for yard at Oakland, Cal., and 1500 ft. of similar tubing for Western yard not specified (Schedule 8654), multiple-stage air compressor, capacity 225 cu. ft. per min., for yard not specified (Schedule 8697).

Consolidated Steel Corp., 5700 South Eastern Avenue, Los Angeles, has let contract to Raymond Concrete Pile Co., 816 West Fifth Street, for four shipways at new plant at north end of west basin, Los Angeles Harbor, for production of vessels for Maritime Commission, Washington. Project will include shops, warehouses, outfitting dock and other structures. Fund of about \$4,000,000 is being secured through Defense Plant Corp., Washington.

San Diego Gas & Electric Co., San Diego, Cal., has plans for new steam-electric generating station at foot of Sampson Street, 280 x 500 ft., equivalent in height to a six-story building, to be known as Silver Gate Generating Station. Cost about \$3,500,000, including turbine-generators, high-pressure boilers and auxiliary equipment. This is part of budget of about \$7,720,000 arranged by company for expansion and improvements, including transmission lines, switching stations, power substations, distribution lines and other work.

Pacific Bridge Co., 333 Kearny Street, San Francisco, plans installation of additional equipment at shipyard at Alameda, Cal., for construction of vessels for government. Fund of \$315,000 has been secured through Defense Plant Corp.

Canada

• **Canadian Car & Foundry Co., Ltd.**, 621 Craig Street West, Montreal, has asked bids on general contract for one-story addition to plant at Ville La Salle, Que. Cost close to \$160,000 with equipment. Spence, Mathias & Burge, 2063 Union Avenue, Montreal, are architects.

Welland Chemical Works, Ltd., Garner Road, Niagara Falls, Ont., heavy chemicals for war industries, has let general contract to Chemical Construction Co., Ltd., Canadian subsidiary of Chemical Construction Corp., 30 Rockefeller Plaza, New York, for one and multi-story addition. Cost about \$2,000,000 with equipment. Work in part will replace portion of ammonia unit, recently damaged by fire.

Oxygen Co. of Canada, Ltd., 2549 St. James Street West, Montreal, has plans for an addition to cost about \$50,000 with equipment. Perry, Luke & Little, 1405 Bishop Street, Montreal, are architects.

Coulter Copper & Brass Co., Ltd., 115 Sumach Street, Toronto, has awarded general contract to Holtby Construction Co., 279 Rusholme Road, Toronto, for a plant addition to cost \$30,000, equipment extra.

Canadian Propellers, Ltd., Room 620, 1010 St. Catharines Street West, Montreal, will build plant addition to cost \$350,000. Contract for superstructure has been awarded to Collet Freres, Ltd., 1978 Parthenais Street.

Noorduyn Aviation, Ltd., St. Laurent, Que., has awarded general contract for a plant addition to Richard & E. J. Ryan, Ltd., Montreal, to cost \$200,000.

Macdonald Bros. Aircraft, Ltd., Winnipeg, Man., has awarded general contract to Bird Construction Co., Ltd., Winnipeg, for an addition to cost \$35,000, equipment extra.

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THE TUNGSTEN-MOLYBDENUM STEEL

that handles like 18-4-1

YOUR heat-treating and forging practice on high speed steel need not be thrown out of gear by the tungsten shortage.

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Bethlehem 66 High-Speed steel is not subject to excessive decarburization. It is thoroughly dependable, will handle the same jobs as 18-4-1 grades and will turn in a comparable performance.

The following is a typical analysis range of Bethlehem 66 tool steel.

C = .79/.84	Cr = 3.75/4.25
Mn = .20/.40	V = 1.40/1.75
Si = .20/.40	Mo = 4.50/5.50
	W = 5.00/5.75

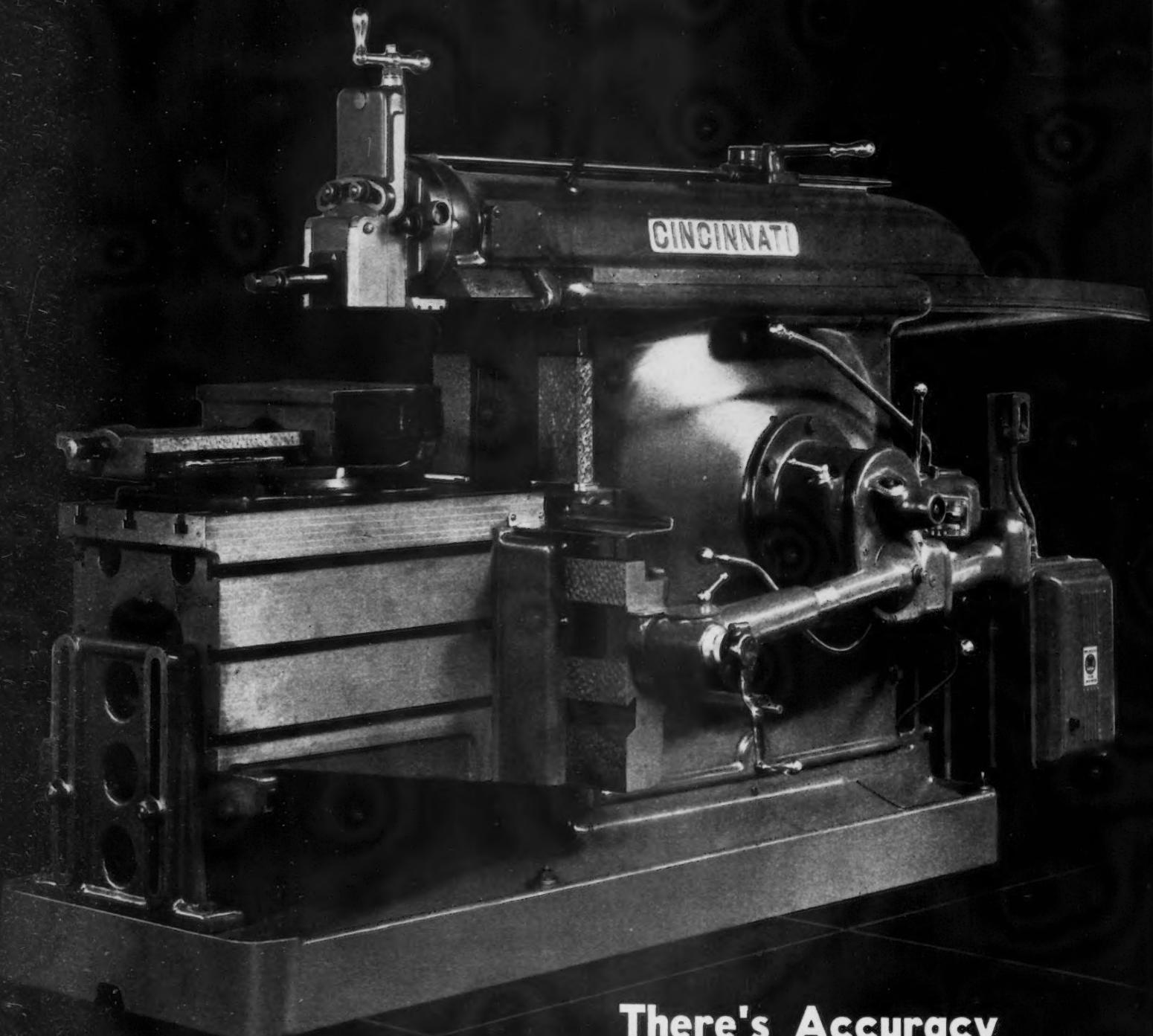
For complete details on Bethlehem 66 High-Speed tool steel, write to Bethlehem Steel Company, Bethlehem, Pa.

BETHLEHEM STEEL COMPANY



THE IRON AGE, September 25, 1941—3

THE IRON AGE, published every Thursday by the CHILTON CO. (INC.). Entered as second class matter November 8, 1932, at the Post Office at Philadelphia under Act of March 3, 1879. \$6.00 a year in U. S., Canada \$8.50, Foreign \$12.00. Vol. 148, No. 13.



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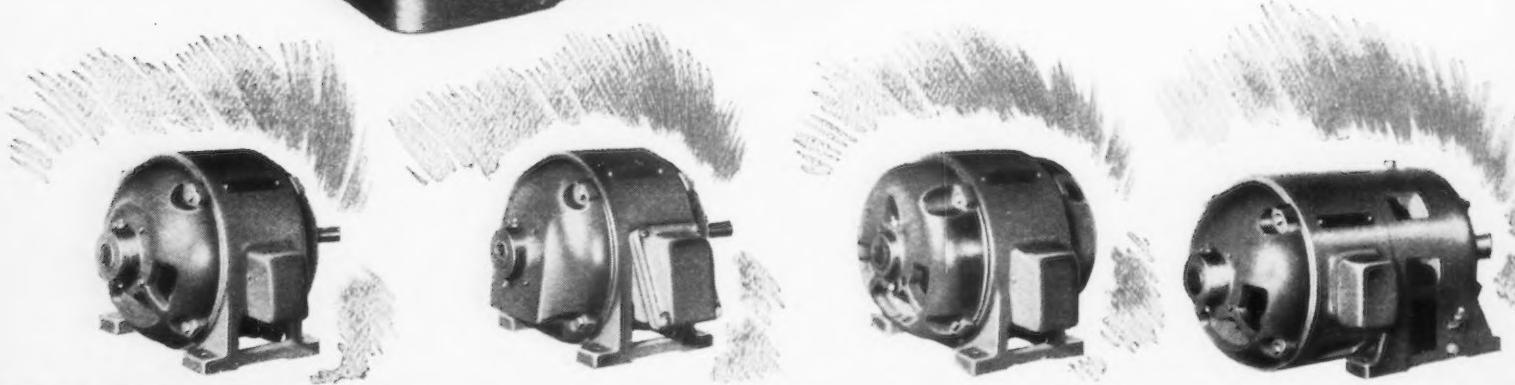
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protection is



TRI-CLAD Sleeve-bearing Polyphase Industrial Motor Is Most Widely Used

A well-protected, open motor for industry's general-purpose needs. Horizontally mounted—for direct-connected and belt drives—it is economical to operate and suitable for a variety of applications.



TRI-CLAD Ball-bearing Polyphase Motor

Has additional advantage of being mountable in other than horizontal positions. Will take end thrust—for example, from beveled-gear pinion. Similar to the sleeve-bearing motor and, like it, available in many types.

TRI-CLAD Splashproof Ball-bearing Polyphase Motor

For use in wet surroundings, such as dairies, breweries, paper mills, canning factories, etc. Furnished with cast-iron, waterproof conduit box, deflecting end shields, and moisture-resistant insulation.

TRI-CLAD Capacitor-Motor (in sleeve-bearing or ball-bearing types)

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For economical, compact, low-speed direct or pinion drive. Wide range of output speeds available. Open, splashproof, and capacitor-motor construction. Oil- and dust-tight housings reduce maintenance.

Built for Protection First.....to Last!

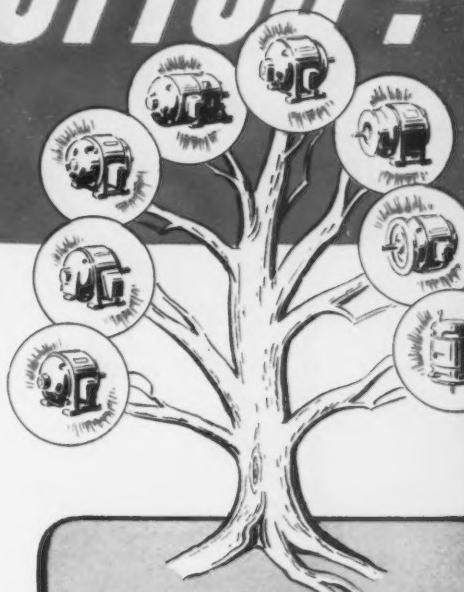
A NEW

is now a *family affair!*

THE improvements in Tri-Clad motor design are *fundamental* improvements, not just "sales features" to popularize a new model. That's why they are being extended, month by month, to a whole family of G-E integral-horsepower motors—both general-purpose and special types.

So, in these special fields you can now count on getting the same benefits of extra protection that have made the *general-purpose* Tri-Clad motor the acknowledged leader in performance and service life.

All these new members of the Tri-Clad family are the result of basic redesign to meet modern industrial conditions. Each has new performance and convenience features important to its particular field of service. For complete information on the right Tri-Clad motor for *your* application, consult our local office, or write General Electric Company, Schenectady, N. Y.



Today a wider range of your special needs can be filled by the growing Tri-Clad motor family. Every member offers extra strength and longer life because of these 3 "extras":

Extra Protection AGAINST PHYSICAL DAMAGE

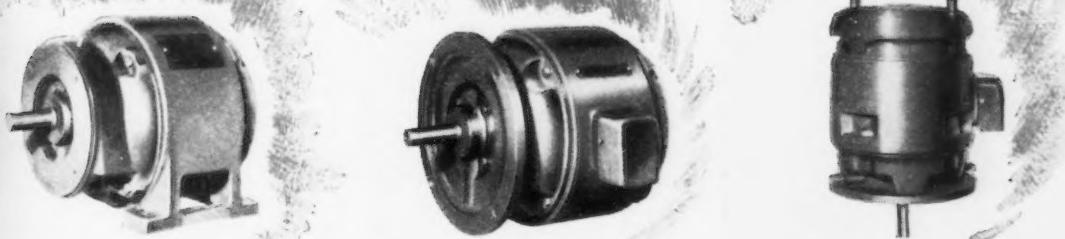
Sturdy, cast-iron frame and end-shield construction.

Extra Protection AGAINST ELECTRICAL BREAKDOWN

Stator windings of Formex wire, "armored" by synthetic resins against moisture, heat, oil, and abrasion.

Extra Protection AGAINST OPERATING WEAR AND TEAR

New sleeve-bearing design and improved ball-bearing mounting lengthen life.



TRI-CLAD Ball-bearing Induction Motor, with Face-type End-shield Mounting
For close-coupled attachment to machine tools, compressors, pumps, etc. Motor bolted from driven machine. A few standard mounting dimensions apply to many motor ratings.

TRI-CLAD Round-frame, Ball-bearing Induction Motor, with Flange-type End-shield Mounting

For close-coupled attachment, or direct bolting to driven machine. Mounting dimensions are standard, but larger than those of face-type end shield.

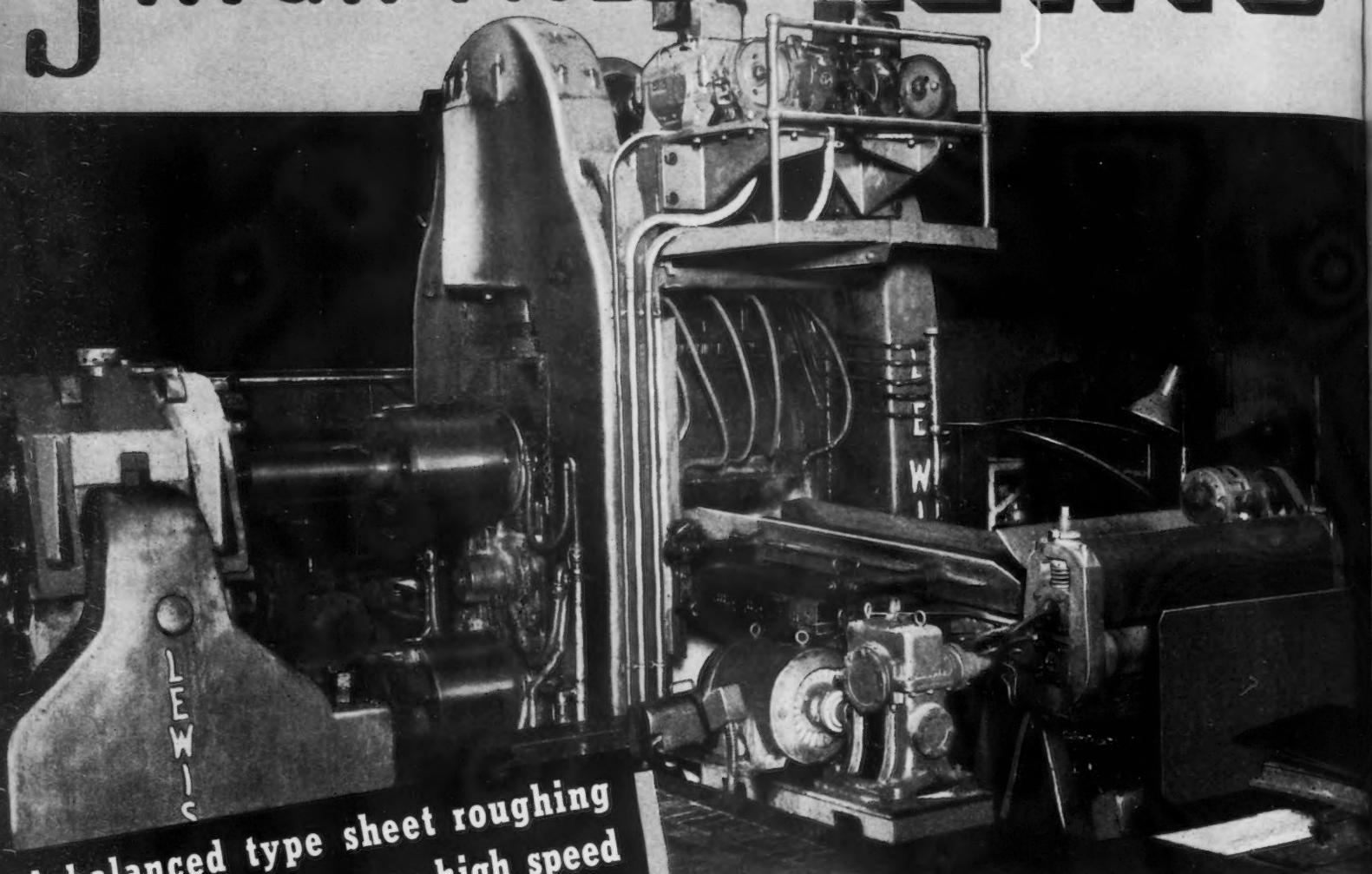
TRI-CLAD Vertical Motor
For general-purpose fan, pump, and machine drives in vertical position. Openings protected and bearings designed for vertical operation. Both polyphase and capacitor-motors available with variety of bases.

In addition, you'll find the modifications to meet special requirements are soundly engineered to give you space-saving, time-saving, and money-saving advantages all down the line. Consult your G-E representative for Tri-Clad horsepower ratings now available.

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It appreciably increases breakdown production of heavy sheet bar.

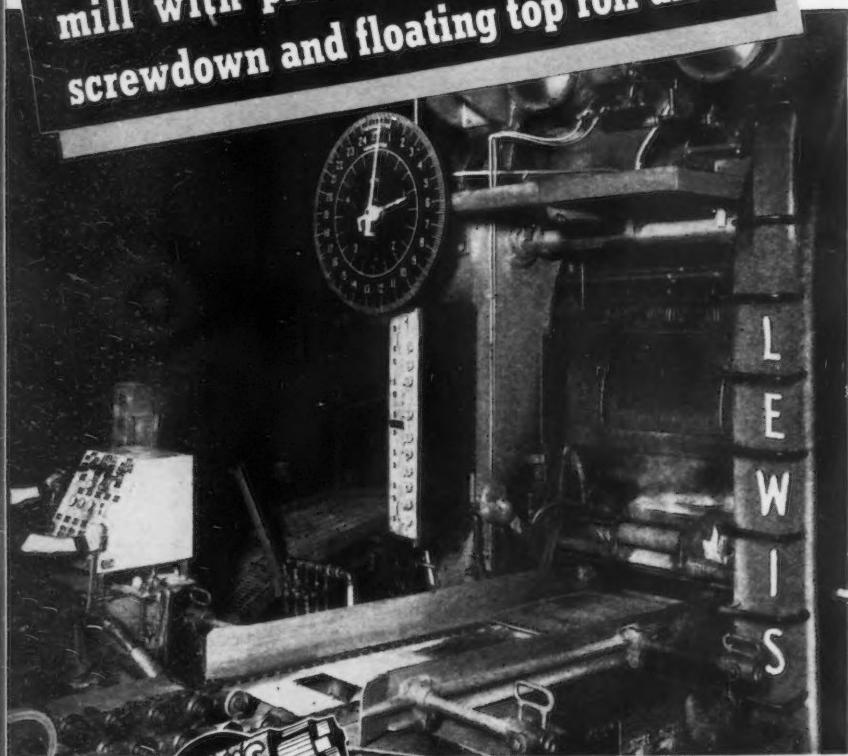
It is equipped with a floating top and bottom roll drive of new design.

No springs are used in balancing the top or middle roll, reducing maintenance costs.

Middle roll balance mechanism is incorporated in middle roll chocks, further reducing maintenance.

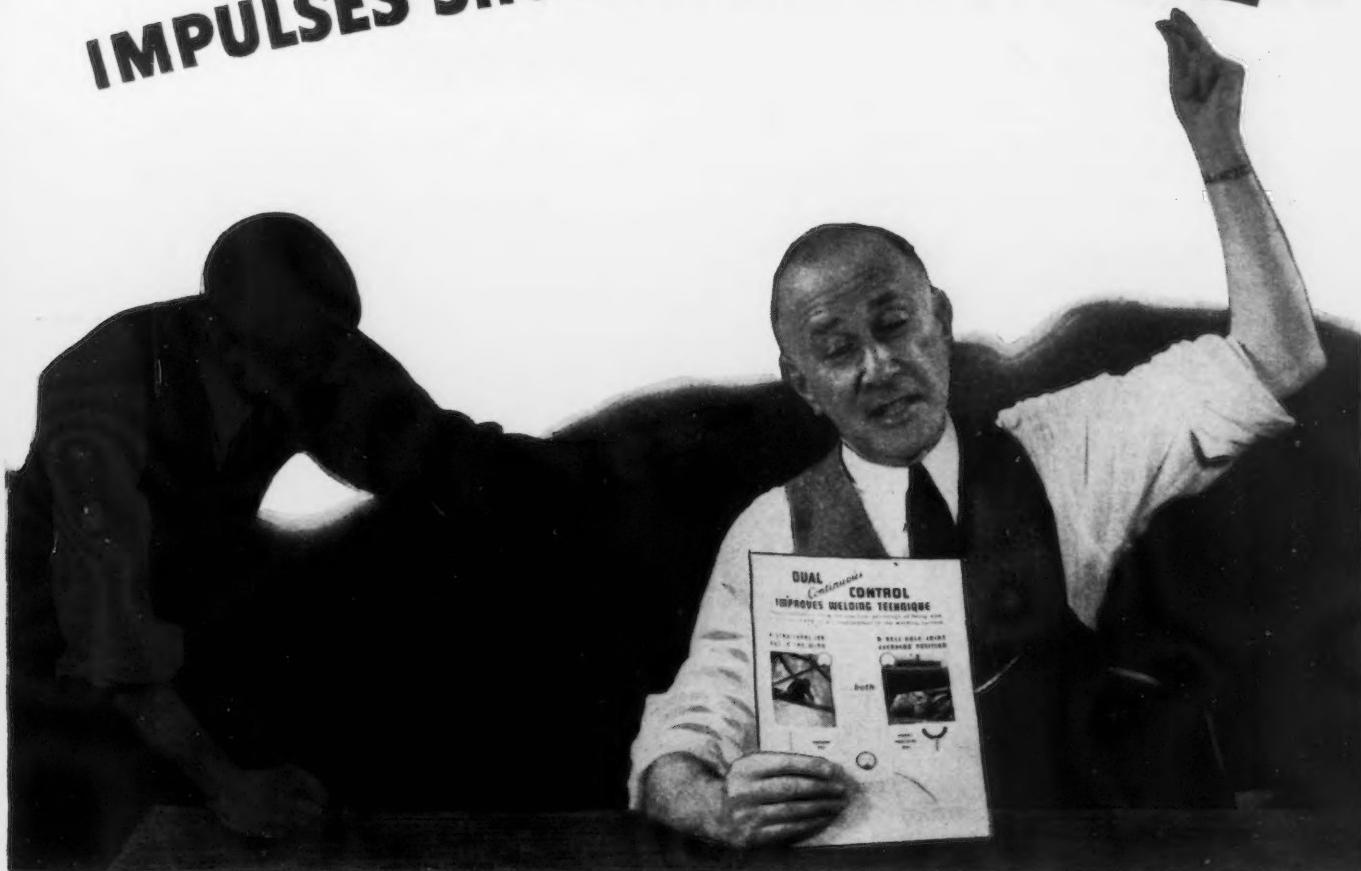
The floating type top roll drive eliminates jump in both top and bottom rolls.

This new mill is still another example of continued improvement and progress of Lewis Rolling Mill Machinery.



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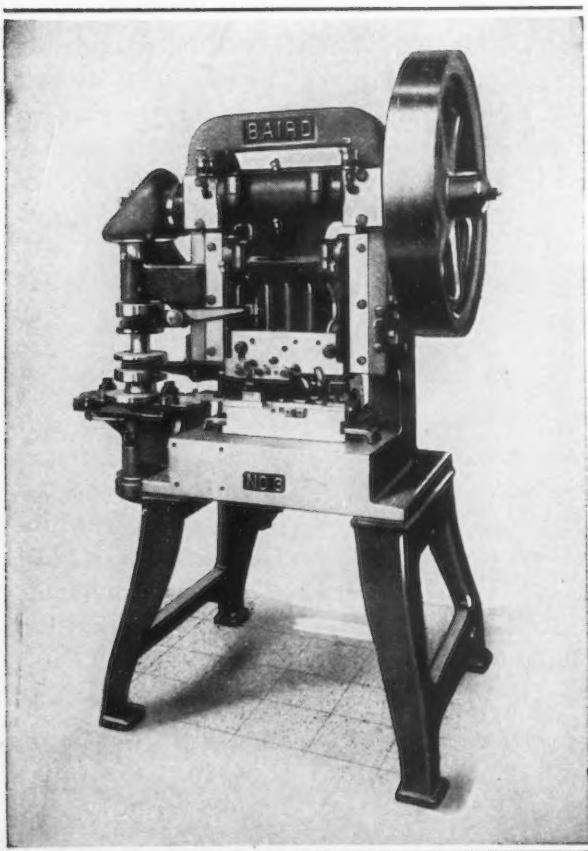
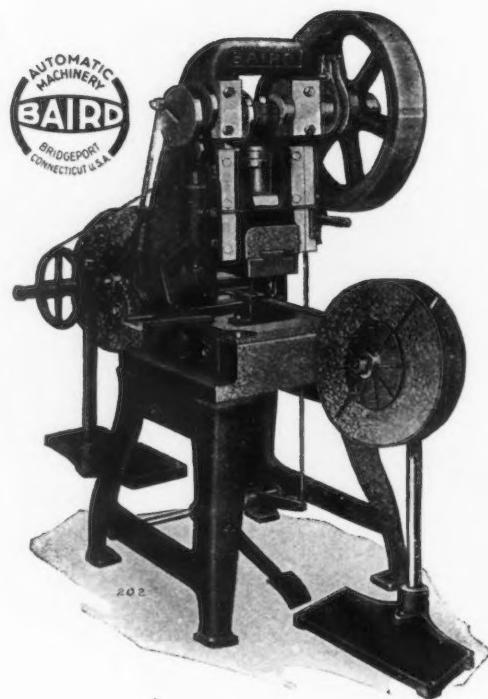
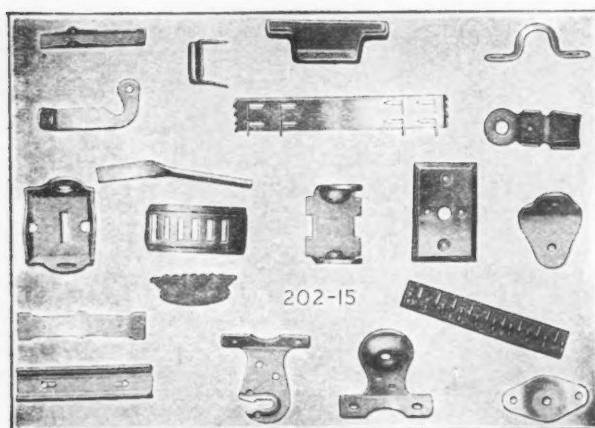
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All punches have independent adjustments. The punches, dies, transfer slide and fingers constitute a unit which may be removed from the press in a very few minutes. This important feature eliminates time-consuming tool set-ups when changing over from one job to the next.

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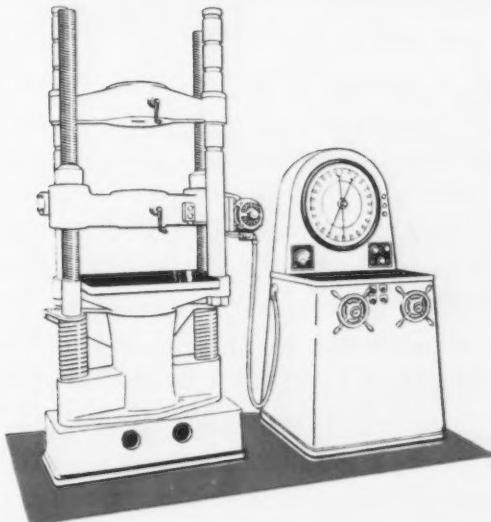
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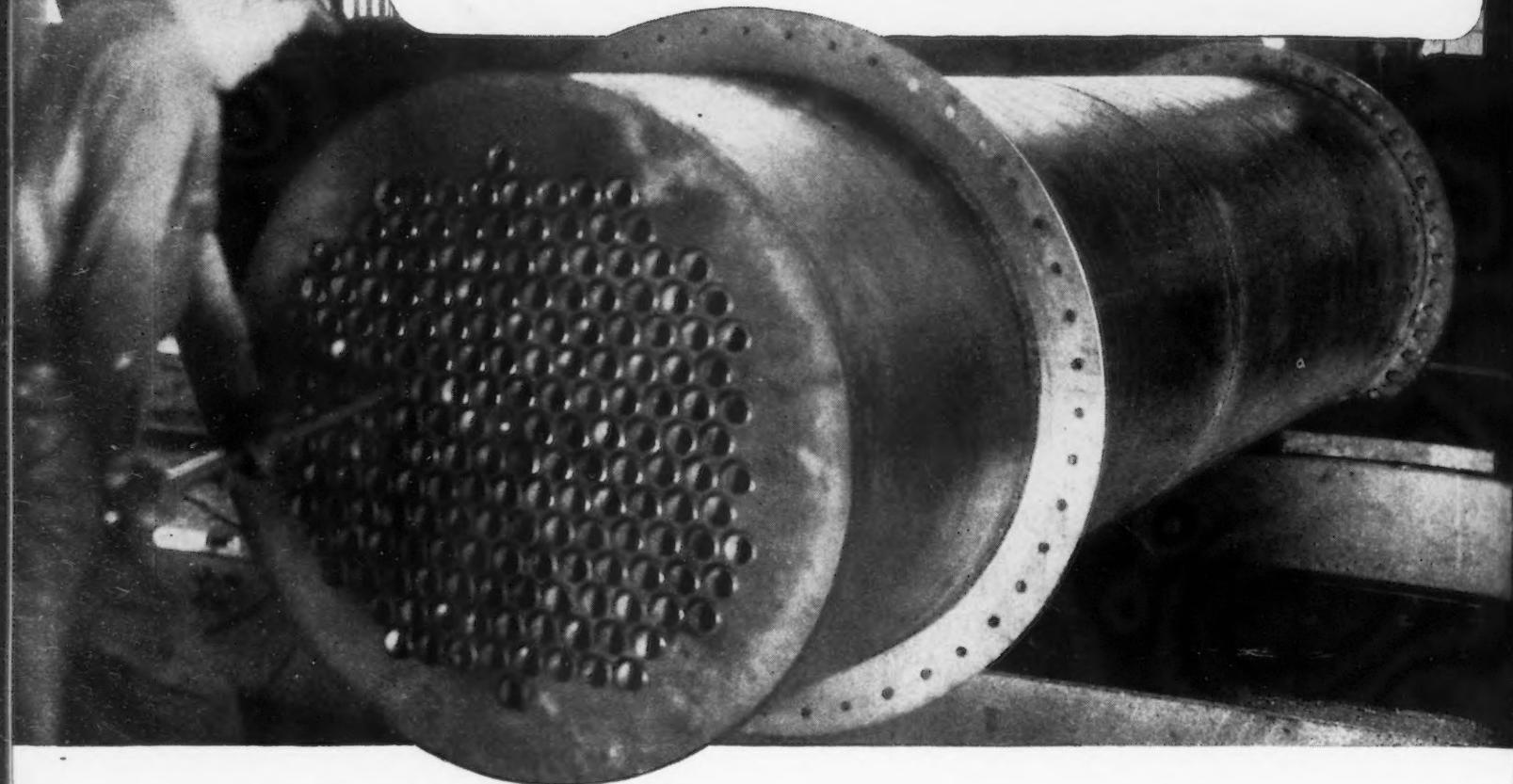
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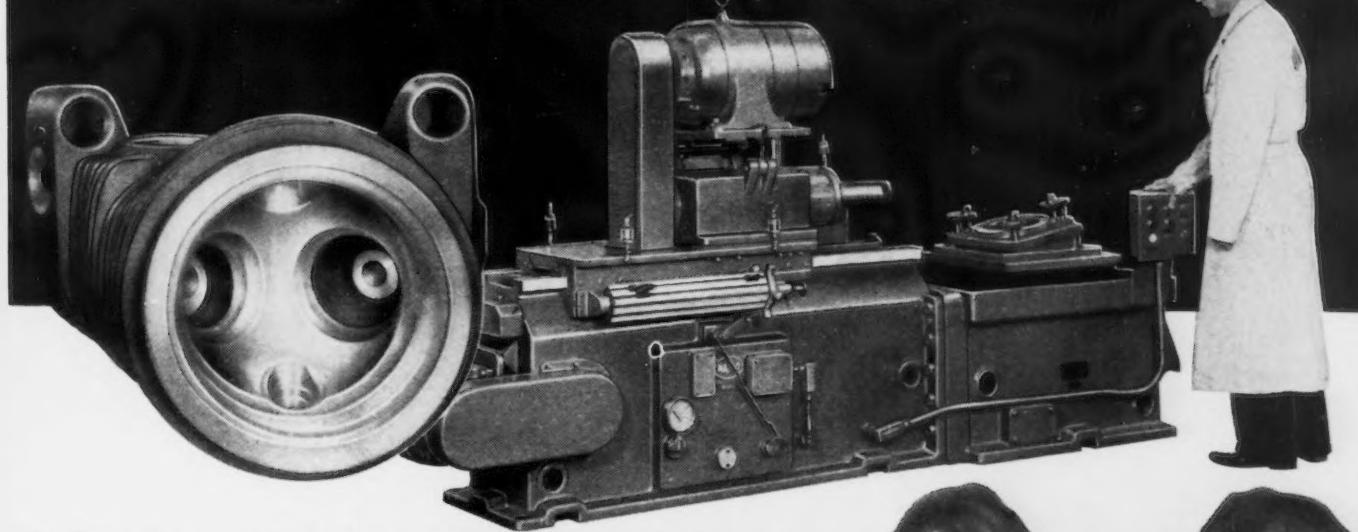
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THE NATIONAL AUTOMATIC TOOL COMPANY
Richmond, Indiana, U. S. A.

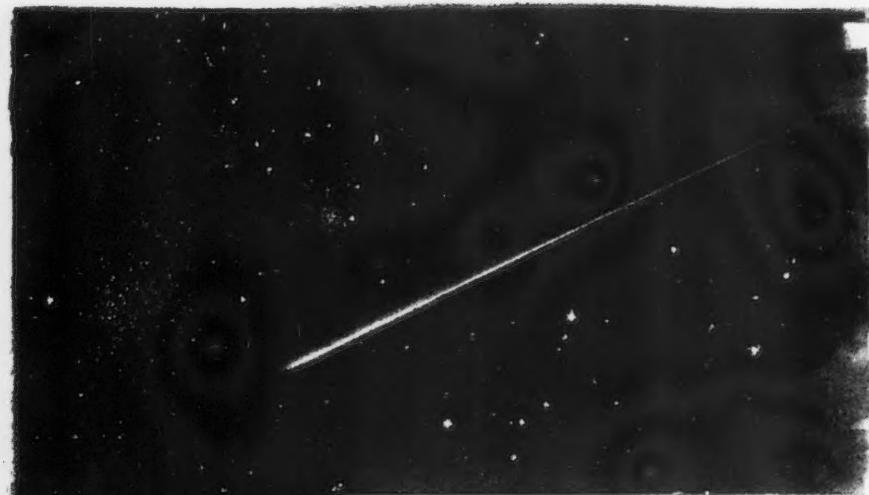
Chicago Office, 1809 Engineering Building
Detroit Office, 409 New Center Building

Investigate
NATCO Methods for
the Lowest Possible
Hole Costs!

NATCO

BORING AND TAPPING MACHINES
SOLVES YOUR "HOLE" PROBLEM

How to Slice a Meteorite!



Interesting, too, are the many industrial uses for Carborundum-made abrasive grains. They help polish and finish countless products, from cutlery to plowshares, from the bevelling of glass to the lapping of transmission gears and the grinding of optical lenses.



Whatever your use of grinding wheels, coated abrasives and other abrasive products may be, our outstanding research, manufacturing and engineering facilities enable us to render your plant a real service. Write The Carborundum Company, Niagara Falls, New York.

CARBORUNDUM
REG. U. S. PAT. OFF.
ABRASIVE PRODUCTS

50 YEARS OF SERVICE TO ALL INDUSTRY



Carborundum and Aloxite are registered trade-marks of
and indicate manufacture by The Carborundum Company.

Ever see a shooting star? There are about 7,500,000 every night! Most of them burn up in the outer atmosphere, and the few that reach the earth are man's only material link with celestial space. For examination and study, these hard, dense meteorites are easily sliced with a special type of bandsaw using Carborundum Brand Abrasive Grain as cutting agent, then finished with finer grain and powders.



33 YEARS COULDN'T WEAR DOWN THIS HORSEPOWER!

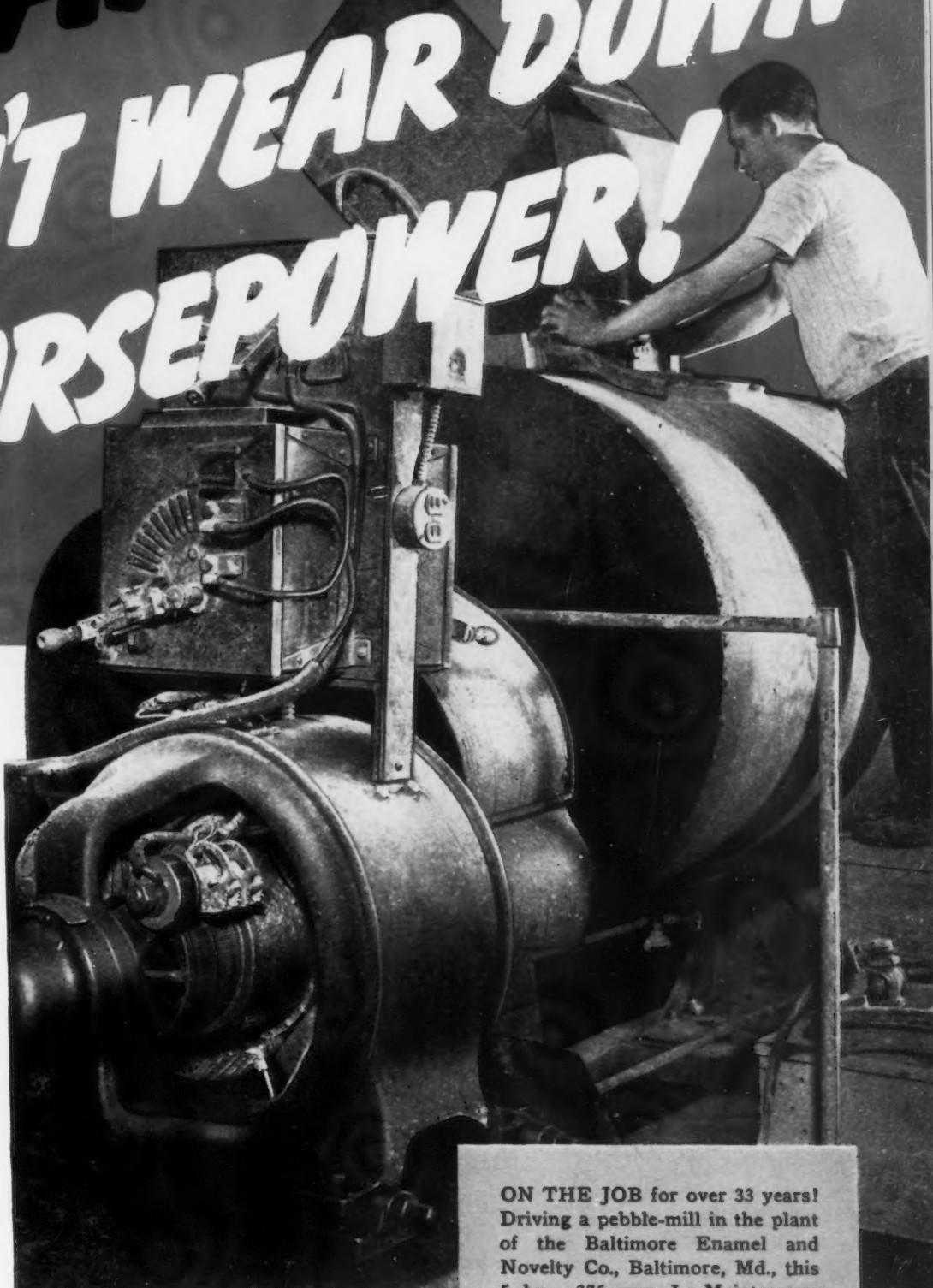
Another Outstanding Case-History of the Dependable, Low Cost Performance of Allis-Chalmers Lo-Maintenance Motors. See How They Can Solve Your Power Problems Too . . .

SINCE 1908—for over 33 long years—this 5 hp — 375 rpm Allis-Chalmers Motor has been harnessed to a pebble-mill in the plant of the Baltimore Enamel and Novelty Co.

Day in and day out, water and abrasive enamel frit have worked to wear it down. But this motor is still on the job, in excellent condition, delivering uninterrupted, full-duty horsepower!

The value of quality construction and dependable operation is even more vital today. And when you buy Lo-Maintenance Motors, Allis-Chalmers engineering sees that you are getting "more motor" for your money.

Outstanding economy and operation are designed and built into Lo-Mainte-



ON THE JOB for over 33 years! Driving a pebble-mill in the plant of the Baltimore Enamel and Novelty Co., Baltimore, Md., this 5 hp — 375 rpm Lo-Maintenance Motor is still delivering dependable, trouble-free service.

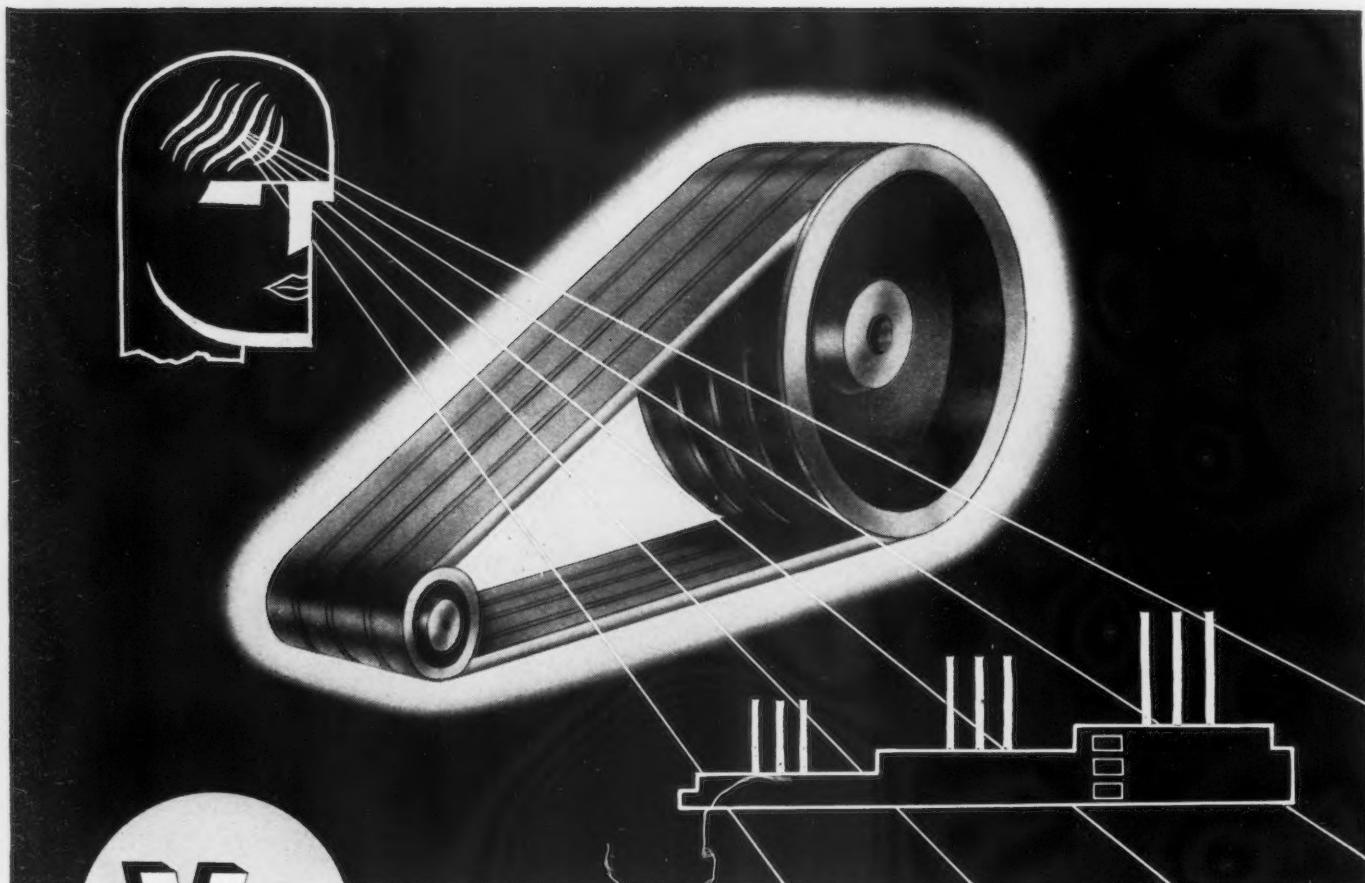
When you want motor performance like this in your plant, call the engineer in the district office near you. Or write Allis-Chalmers, Milwaukee, Wisconsin.

A-1438



ALLIS-CHALMERS LO-MAINTENANCE MOTORS

A COMPLETE LINE FOR EVERY PURPOSE...ONE-HALF HORSEPOWER AND UP



The use of this emblem by an association member in connection with Multiple V-Belt Drives is your assurance of mechanical excellence — the result of cooperative engineering, research and experience.

an idea to an industry in a few short years . . .

From the discovery and application of the wheel as a fundamental mechanical principle, the problem of efficient and economical transmission of power has intrigued the best engineering talent through the centuries. . . . With every improvement in methods came far-reaching changes in industry — changes effecting corresponding improvements in products — in lower manufacturing costs, and, therefore, lower consumer prices. . . . At no stage of power transmission development has progress made such giant strides as in the past few years since the Multiple-V-Belt Drive was introduced. . . . Thanks to the pooling of engineering research efforts by Association Members, plus self-imposed high engineering standards, Multiple-V-Belt Drives enable industry to transform power into revolutions per minute smoothly, quietly and economically with amazingly high efficiency. . . . Today, the application of "The Dominant Drive of Industry" is practically universal. Its benefits are shared by every consumer of mechanically produced products.

MULTIPLE - V - BELT DRIVE ASSOCIATION
140 SOUTH DEARBORN STREET • CHICAGO

New C-H Manual Starter WITH PUSHBUTTON OPERATION

(NEMA Size 1 for A.C. Motors
from 1½ to 7½ h.p.)

Now Cutler-Hammer announces a new Size 1 Bulletin 9115 Manual Starter with PUSHBUTTON operation. This is an entirely new model . . . has the famous C-H Eutectic Alloy Overload Protection, interchangeability of parts with C-H Size 1 Magnetic Starters, and many other positive advantages. Note the compactness of this starter, its modern styling and appearance, its convenience of wiring.

The 3-pole pushbutton starter is priced at only \$9.50; other sizes in proportion.

Write at once for further details. CUTLER-HAMMER,
Inc., 1325 St. Paul Ave.,
Milwaukee, Wis.

Associate: Canadian
Cutler-Hammer,
Ltd., Toronto.



These new features tell the whole story
1. New heavy "fine" silver, removable and stationary contacts. Easy to reach for inspection and replacement (interchangeable with contacts on size 1, C-H 9586 Automatic Starters).

2. New clamp type pressure connectors on line terminals.

3. New easy operating, quick break pushbutton mechanism.

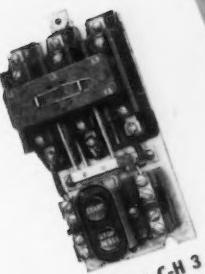
4. New rubber mounted panel with effective grounding clip.

Loosen but one screw to remove panel.

5. New enclosing case; light interior, exceptionally large wiring space, plenty of knock-outs.

6. Heater coils interchangeable with size 0, C-H 9115, sizes 0, 1, 2, C-H 9586 and many other standard C-H starters.

7. Available in 2, 3, or 4 pole construction.



Skeleton Type C-H 3 Pole Pushbutton Starter

C-H Skeleton Starters solve many costly "built-in" control problems for busy machinery manufacturers. They offer the same modern construction and features as the enclosed starter shown above.

Dust Safe VERTICAL Contacts



A TWIST of the WRIST
RESTORES POWER
for PRODUCTION

GENERAL  ELECTRIC
AIR CIRCUIT BREAKER

MADE IN U.S.A.

PROTECT YOUR Resistance Welders against Electrical Shutdowns

Circuit breakers on your resistance-welding machines prevent lost time and motion hunting for blown fuses and replacing them. Specially designed for resistance welding, G-E circuit breakers give you full interrupting capacity, permit large during-weld currents, and protect both equipment and operator.

Easily installed where most convenient, these dustproof, two-pole breakers can be put on the wall or the machine. The new enclosing case and mounting simplify inspection and adjustment. Learn how *your* production and profits can be protected and improved by these breakers. We shall be glad to give you complete information. Ask your G-E office for bulletins GEA-3600 and GEA-2997, or write General Electric, Schenectady, New York.

Standard two-pole breaker unit
showing arc quenchers and instantaneou s over-current trips

GENERAL  ELECTRIC

860-17-3748; 7500

FOR THE AERIAL DEFENSE OF AMERICA . . .

N-A-X

High Tensile

(X9115)

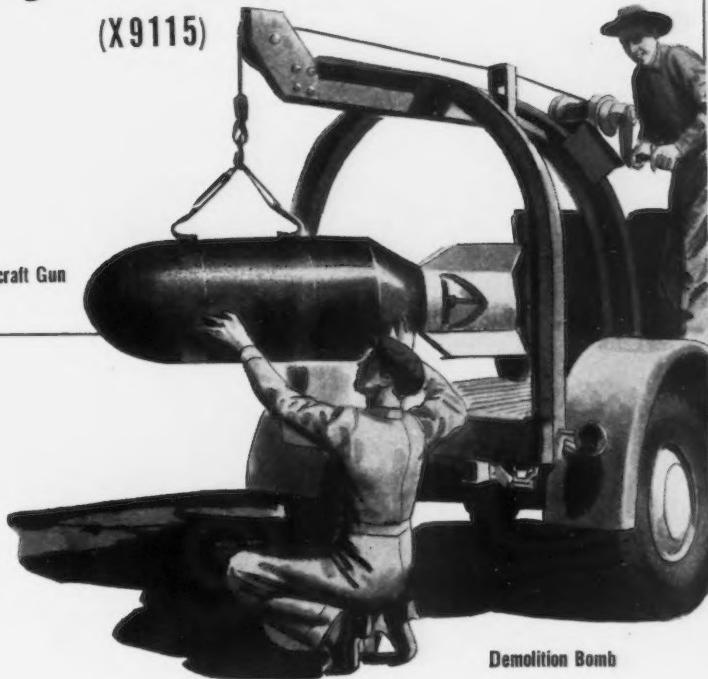
DUCTILITY
ITS INHERENTLY FINE GRAN
MAKES ALL THE DIFFERENCE

STRENGTH



Oxygen Supply Container

Bofors 40mm Anti-Aircraft Gun



Demolition Bomb

is being used in increasing quantities

Because N-A-X HIGH TENSILE is a really superior low alloy steel—one that has unusually high resistance to IMPACT and FATIGUE—it is being used in a multiplicity of defense applications—in the air, on the ground, at sea.

N-A-X HIGH TENSILE has other important properties, too, that permit the fabricator to form parts and products with speed and ease. This low alloy steel works well in all phases of fabrication, and its outstanding ductility and cold forming properties combined with excellent welding characteristics make for low-cost fabrication.

Long before the rush to arm this country was paramount, N-A-X HIGH TENSILE was being used in hundreds of exacting applications. It met the specifications of discrim-

inating manufacturers and users. Quite logically, then, it was natural for fabricators to think first of N-A-X HIGH TENSILE. Today, it is being used in ever increasing quantities—and doing an excellent job in every application. N-A-X HIGH TENSILE performs outstandingly in each type of treatment—stamping, hot and cold forming, welding, machining and heat treating.

Would you like to have full information about N-A-X HIGH TENSILE? Call for a Great Lakes engineer today. He will be glad to aid you in the use of this superior low alloy steel—show you how hundreds of others are producing quality products smoothly, quickly, economically. Write, wire or telephone for a Great Lakes engineer today.

LIST OF PRODUCTS

Hot Rolled Strip (down to 1 inch wide) . . . Hot Rolled Strip Sheets (up to 91 inches wide) . . . Spring Steel (carbon and alloy) . . . Merchant Bars . . . Forging Bars . . . Automobile Bumper Sections . . . Bar Mill Sections . . . N-A-X HIGH TENSILE Bars, Shapes, Sheets, Billets . . . Sheet Bars . . . Hot and Cold Rolled Sheets . . . Michigan Metal for Vitreous Enameling . . . Deep Drawing Quality (in all grades, widths up to 91 inches) . . . Stran-Steel Metal Framing for Residential and Commercial Construction.

GREAT LAKES STEEL CORPORATION—DETROIT, MICHIGAN

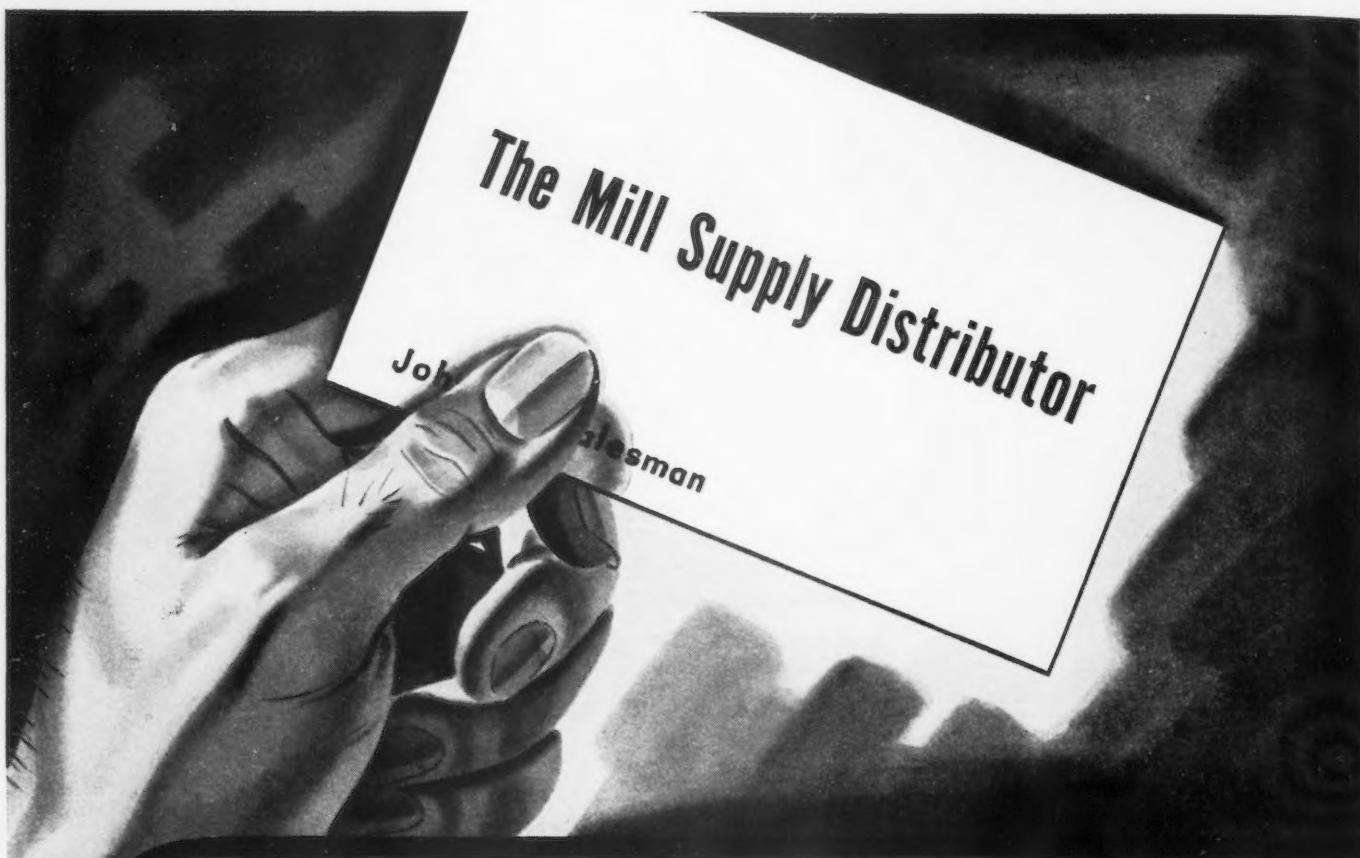
Sales Offices in Principal Cities

division of



NATIONAL STEEL CORPORATION

Executive Offices, Pittsburgh, Pa.



"Send Him In—He's Our Man!"

Indeed, your Mill Supply Representative
is "your man"—

More today than ever, in fact, because
part of his job these days is to know
where you can pick up stocks of
urgently-needed materials or parts—to
help keep your plant in production.

Think of *your* Mill Supply Distributor
as both your salesman and your cus-
tomer. And think of him as your con-
venient source of Cle-Forge High Speed
Drills and Peerless High Speed Reamers
—for "Cleveland" Tools are sold
through Distributors exclusively.

We favor adequate Preparedness for National Defense

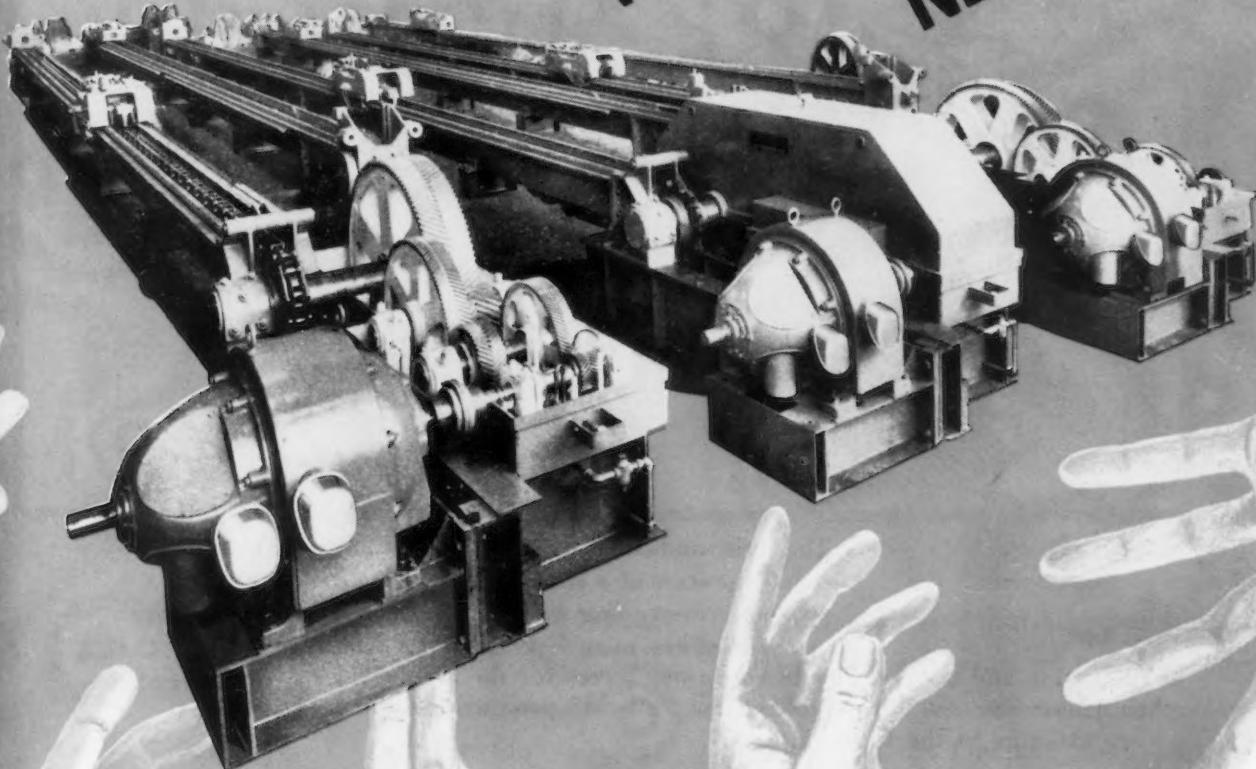
The **CLEVELAND** TWIST DRILL COMPANY
TRADE MARK REG. U. S. PAT. OFF. AND FOREIGN COUNTRIES
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"CLEVELAND" DISTRIBUTORS EVERYWHERE ARE READY TO SERVE YOU

Six 50,000 Pound
Single Chain, High
Speed Drawbenches.

WILLING HANDS
NEED MACHINES



Blitzkriegs cannot be defeated by manpower alone. In these days of highly mechanized armies, old fashioned, slow production methods have no place. Aetna's skilled designers and efficient builders are producing high speed, dependable equipment that will keep your plant up-to-date in this fast moving age.

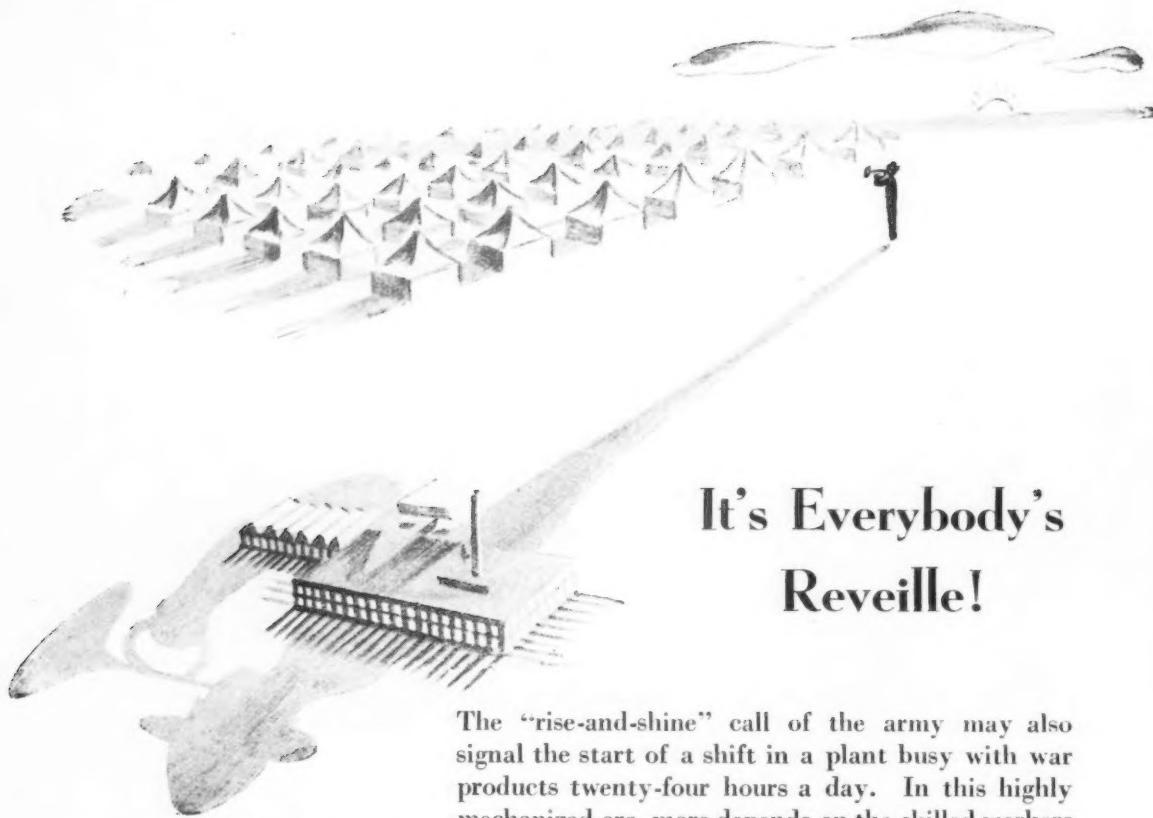
The AETNA-
STANDARD
ENGINEERING COMPANY

* YOUNGSTOWN, OHIO, U.S.A. *

ASSOCIATED COMPANIES

HEAD, WRIGHTSON & COMPANY, LIMITED, THORNABY-ON-TEES, ENGLAND • AKTIEBOLAGET ARBOGA MEKANISKA
VERKSTAD, ARBOGA, SWEDEN • JOHN INGLIS COMPANY, LIMITED, TORONTO, ONTARIO, CANADA

Designers and Builders to the Steel, Non-ferrous and Chemical Industries



It's Everybody's Reveille!

The "rise-and-shine" call of the army may also signal the start of a shift in a plant busy with war products twenty-four hours a day. In this highly mechanized era, more depends on the skilled workers of the nation and their ability to equip our forces for the defense of ours and other democracies. "All-out" aid means "all-out" production—and as our bit we are utilizing to the fullest extent:

- * *A Production Line* for shipment of springs in large or small quantities to meet *your* production line requirements.
- * *A Production Line* of heat-treating equipment, batch type and continuous, with carefully controlled atmospheres.
- * *A Production Mill* producing unexcelled cold-rolled spring steel.
- * *Time-trained craftsmen*...whose life calling is springmaking.

For American Products

Barnes-made Springs
and Spring Steel

WALLACE BARNES CO., BRISTOL, CONN., U.S.A.
DIVISION OF ASSOCIATED SPRING CORPORATION

Parlon Drafted

THE REASONS ARE IMPORTANT
TO EVERY MANUFACTURER
WHO IS LOOKING AHEAD



**DEFENSE OF
DEFENSE EQUIPMENT
NOW COMES FIRST**

Because Parlon-fortified synthetic enamels cut drying time in half (with or without ovens), and provide tougher, more resistant finishes, U. S. A. defense is now preempting all Parlon production. You are, therefore, asked to show priority ratings on the purchase orders for Parlon finishes that you send to your suppliers.

**A TEMPORARY
CONDITION, WE HOPE**

During the past year the use of Parlon-fortified finishes has grown enormously. Your suppliers are now unable to meet *all* the demand

for Parlon-fortified finishes; but when these unusual conditions are over, Parlon-fortified finishes will again be available *in abundance* to help you cut finishing costs, and to give your products *super protection*.

NOW IS THE TIME

**TO
LOOK AHEAD**

Whatever you produce, from adding machines to motor trucks, you can prepare now to get going fast with better, quicker, overhead-cutting Parlon-fortified finishes when normal business returns. We'll be glad to cooperate with you to the best of our ability.

GGG-35

PARLON

CELLULOSE PRODUCTS DEPARTMENT

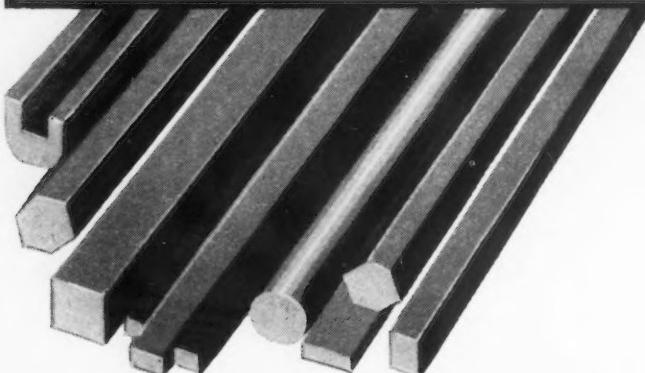
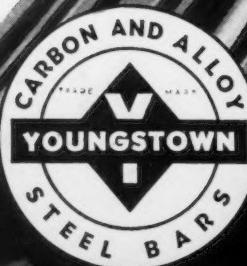
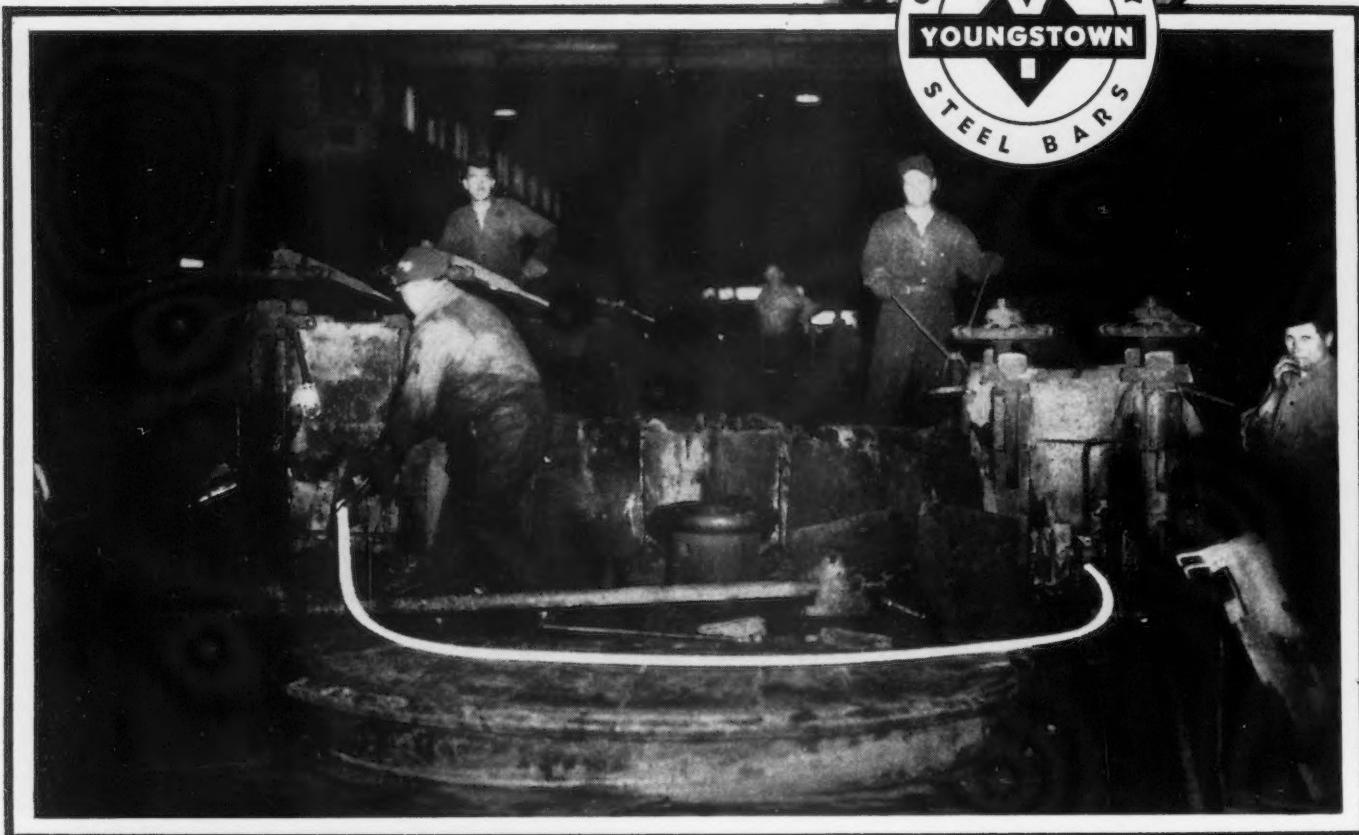
HERCULES POWDER COMPANY
INCORPORATED

934 Market Street • Wilmington, Delaware



MINDING his "P's" and "Q's"

in the Bar Mill



Quality Production, but *always* Quality Paramount:

Believe it or not, those are the "P's" and "Q's" that this husky steelmaker is minding as he expertly seizes and throws this fast-moving, white-hot rod from one set of finishing rolls to the next.

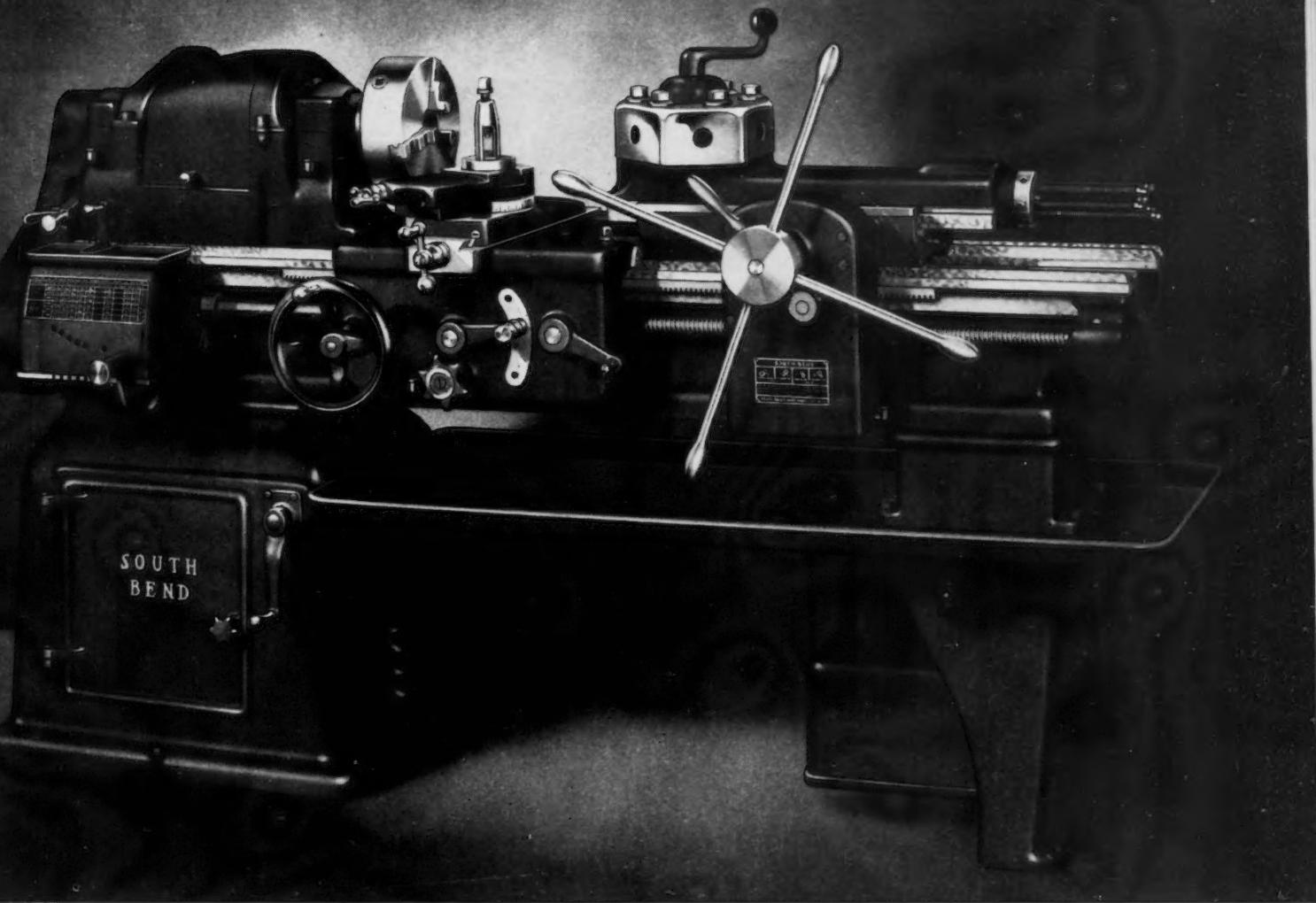
It is this minding of "P's" and "Q's" by every Youngstown workman who handles a material or tends a machine -- from blast furnace to final inspection -- that has established Youngstown's enviable reputation for quality rods and bars and shapes, for uniformity of chemical composition and physical characteristics, and for unexcelled performance in fabrication and service.

Bars - Rods - Wire - Nails - Sheets - Plates - Conduit - Tin Plate - Pipe and Tubular Products - Tie Plates and Spikes

15-4D

THE
YOUNGSTOWN
SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steels
General Offices - YOUNGSTOWN, OHIO



SOUTH BEND TURRET LATHES

For Rapid Production in the Defense Industries

THIS NEW South Bend 16" Turret Lathe combines the precision and versatility of a toolroom lathe with the rapid production facilities of a turret lathe.

The power feed ram-type turret has six faces, with automatic indexing and individual stop for each face. The turret is mounted on the inside bed ways and may be clamped at any location the entire length of the bed.

The carriage has friction clutch drive for power cross feeds and power longitudinal feeds, also lead screw and split nut for cutting accurate screw threads. Mounted on the outer bed ways, the saddle wings clear the turret base to allow free movement of the carriage. Telescopic taper attachment, hand lever collet chuck and other attachments can be supplied.

The quick change gear box provides 48 changes for all carriage feeds and turret feeds. In addition, there is provision for changing the direction and speed of the turret feeds with relation to the carriage feeds.

The direct motor drive provides twelve spindle speeds ranging from 21 to 731 R. P. M. Headstock spindle has 1 $\frac{3}{8}$ " capacity for bar stock. Rapid acting hand lever collet takes up to 1" round stock.

In addition to this turret lathe we manufacture a complete line of back-geared screw cutting lathes, 9" to 16" swing, for toolroom and general shop use. Also 9" and 10" swing lathes with hand lever bed turret. Our factory is equipped to make prompt delivery on priority rated orders. Write for dealer's name.



SOUTH BEND LATHE WORKS

Lathe Builders For 35 Years

589 East Madison Street

South Bend, Indiana, U. S. A.



CENSORSHIP IN STEEL

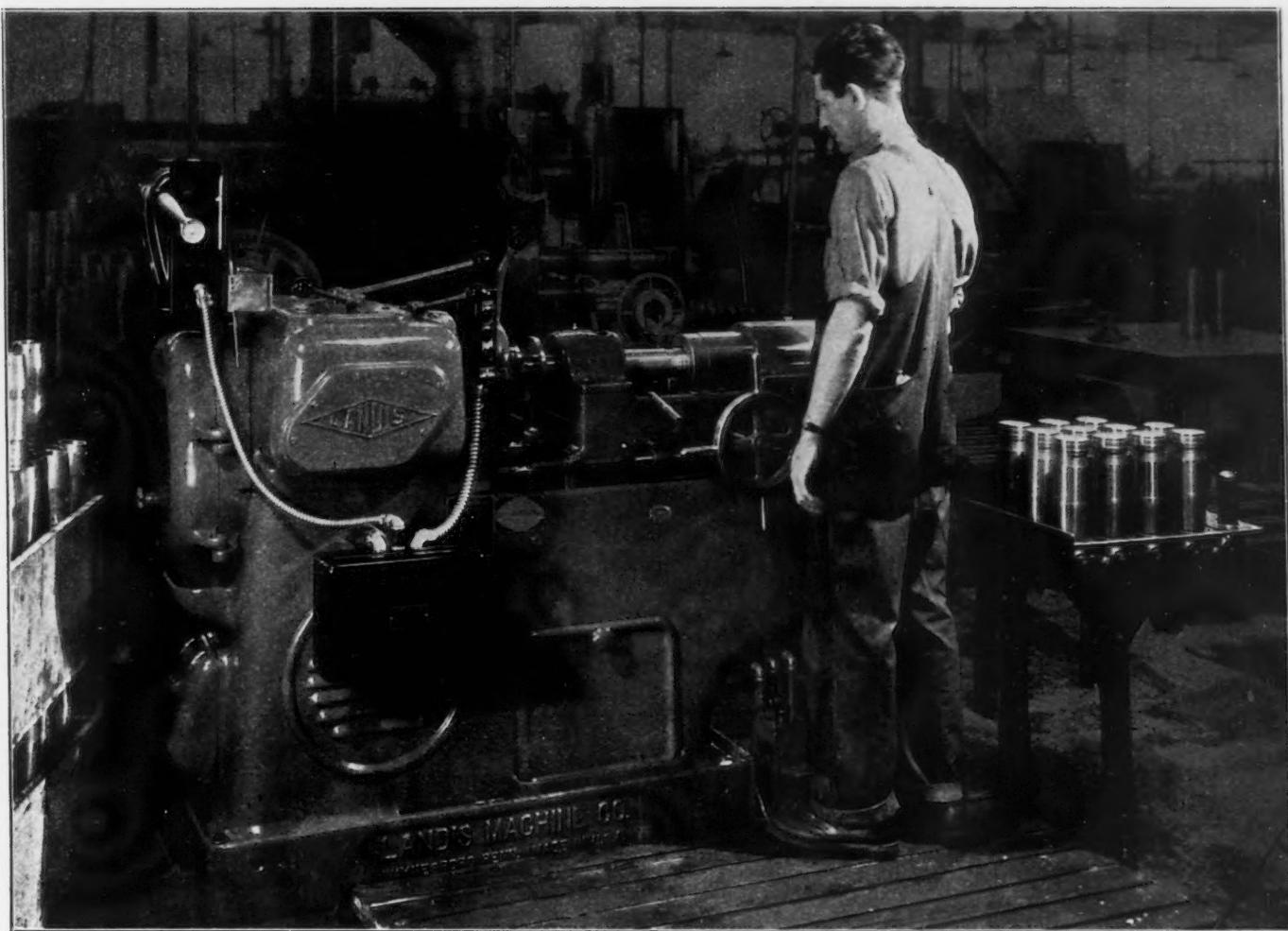
Outstanding success in censoring impurities has been achieved by using either high or medium-carbon Ferro-Carbon Titanium as the final deoxidizer in the ladle. We'll be glad to send you data on its successful use.

TITANIUM
ALLOY MANUFACTURING COMPANY

TAM
ZIRCONIUM & TITANIUM
PRODUCTS
Registered U. S. Pat. Off.

**GENERAL OFFICES AND WORKS: NIAGARA FALLS, N. Y., U. S. A.
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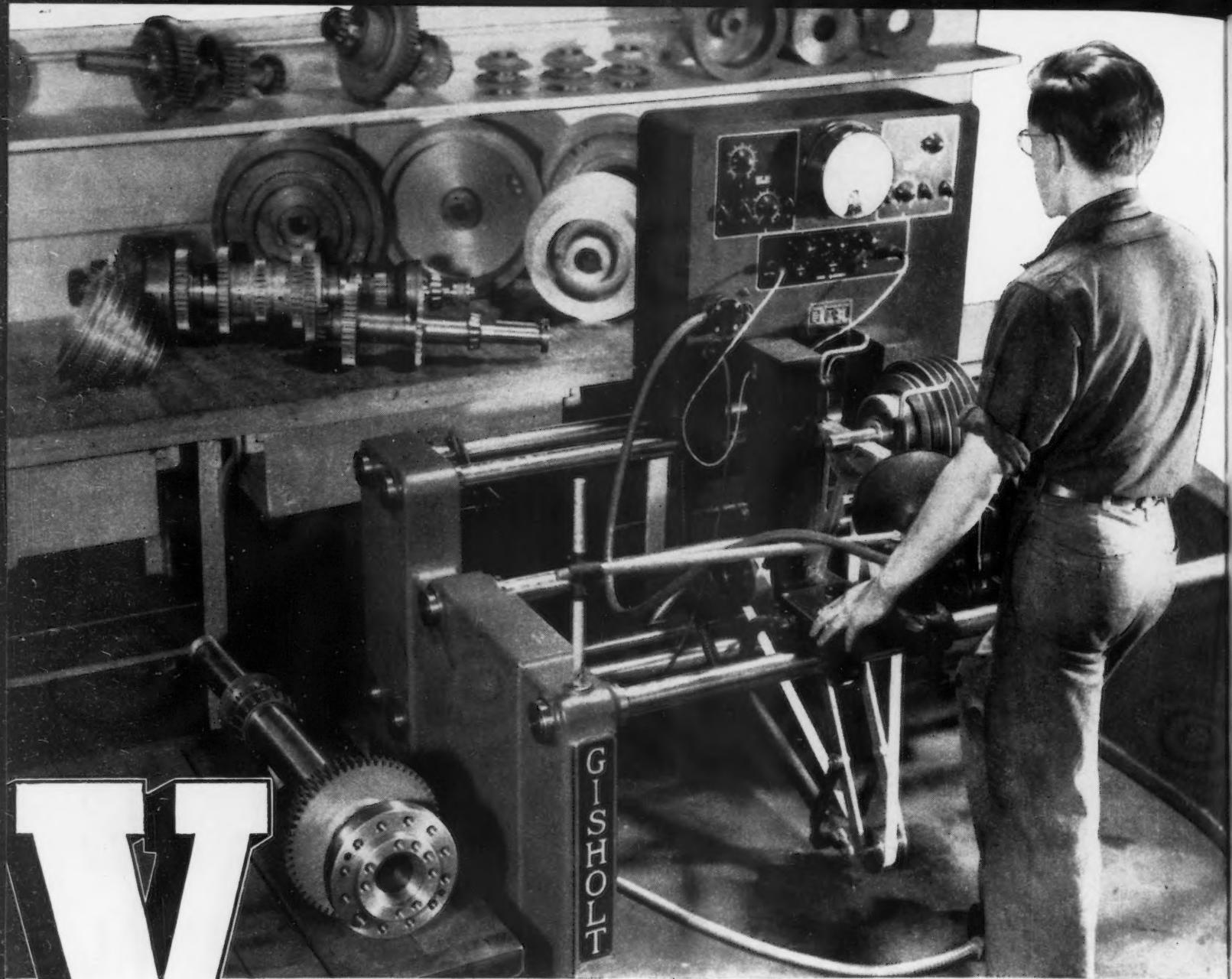
PRODUCTIVE • ACCURATE • ECONOMICAL — the 1½ R LANDMACO SHELL TAPPER

The illustration shows the 1½ R LANDMACO Shell Tapper producing 3" Anti Aircraft Shells

The 1½ R LANDMACO Shell Tapper is a precisely built tool designed especially for tapping shell noses. One machine and one universal fixture will handle all sizes of shells from 75 M/M to 155 M/M inclusive. Production will average from 95 to 116 shells per hour depending upon the size of the shell—and the unusually rigid construction and well engineered design of the machine assures threads within .003" for concentricity with the outside diameter of the work.

For assured Thread Concentricity and greater Productivity in Munitions Threading—Investigate the 1½ R LANDMACO Shell Tapper.

LANDIS
MACHINE COMPANY, Waynesboro
Pennsylvania



Versatile

FOR BALANCING MANY DIFFERENT PARTS!

Yes, any of these different sizes and types of parts are now statically and dynamically balanced—in a few moments—on this *one machine*!

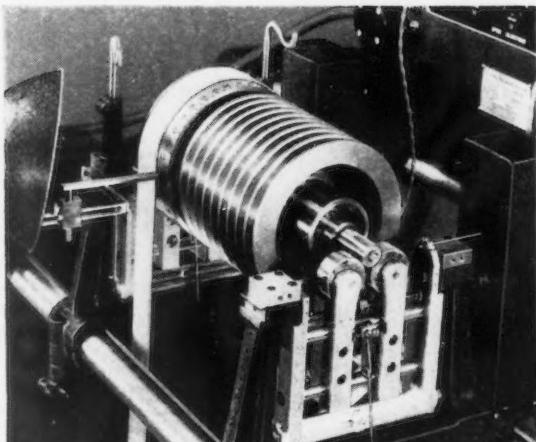
This development enables you to make important product improvements—to eliminate noisy and destructive vibration—to assure quieter operation and longer life of rotating parts.

DYNETRIC BALANCING MACHINES

By detecting and amplifying unbalance vibrations, Gisholt Dynetric Balancing Machines enable you to locate, measure and correct unbalance in a way that is quick, easy and accurate. Speed in handling such a variety of parts makes proper balancing more economical than ever before.

If your product will benefit through the accurate balancing of rotating parts, write for literature.

GISHOLT MACHINE COMPANY
1215 E. Washington Ave., Madison, Wisconsin



★ Balancing a Vee-belt sheave for a machine tool. Note the roller-type work-supports which are adjustable to accommodate a variety of shaft sizes, permitting the balancing of other rotating parts with only one set of work supports.

*Look ahead...keep ahead...
with Gisholt improvements*

TURRET LATHES • AUTOMATIC LATHES • BALANCING MACHINES

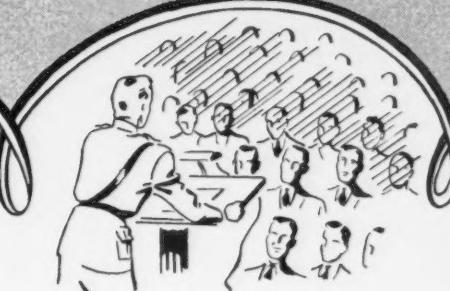


TAKE PART IN

THE METAL INDUSTRY'S

BIGGEST DEFENSE MANEUVERS!

PHILADELPHIA, OCTOBER 20-24



The entire metal industry is pooling its knowledge of defense production and conservation at the 1941 Metal Congress & Exposition in Philadelphia, October 20-24.

Under direct request of many manufacturers a comprehensive program of group meetings on Defense Problems, Conservation and Substitution has been prepared. These group meetings are not to be of the ordinary round-table type where everything is left to chance but are to be well-planned presentations.

A representative will present at each meeting the latest information on the scarce materials involved in the clinic and the status of substitute materials, also indicating how industry can assist in and adjust itself to the present shortages. Since meetings will be "off-the-record" men of industry will be free to discuss actual production problems and quote examples.

Subjects to be discussed include alloy steels, stainless, molybdenum, tool steels . . . alloy castings . . . bearing metals . . . shells . . . aluminum

. . . magnesium . . . copper . . . inspection of metals . . . priorities, etc.

In addition to these afternoon and evening clinic meetings, more than 80 technical papers will be presented at regular annual meetings of the four technical societies who cooperate in the Metal Congress.

And—at the Metal Exposition—the exhibits of 300 leading manufacturers in the metal industry (largest show ever held) will feature the latest, most modern materials, equipment, and processes for speeding production.

Don't miss the opportunity of hearing the nation's leading defense experts in Philadelphia—your defense job demands representation at the Metal Congress & Exposition!

COOPERATING SOCIETIES

American Welding Society. Wire Association. American Society for Metals. Iron & Steel Division and Institute of Metals Division. American Institute of Mining & Metallurgical Engineers.

Address: W. H. Eisenman, Secretary, American Society for Metals, 7302 Euclid Ave., Cleveland, O.

NATIONAL METAL CONGRESS AND EXPOSITION

PHILADELPHIA PUBLIC AUDITORIUMS



INCREASED SPEED PLUS
SMOOTH, UNIFORM,
HIGH QUALITY WELDS
.....with



No. 81 ELECTRODE



Heavy ring being welded with Airco No. 81 Electrode using Wilson Hornet Arc Welder.
Photographs courtesy of Louisville Drying Machinery Company.



Accelerate production — speed up the welding of frames, tanks, pressure vessels, pipe and structural members with Airco No. 81 Electrode. This high-speed, mild steel electrode is designed especially for making single pass horizontal fillets on $\frac{1}{4}$ " and heavier steel, and single or multiple pass flat positioned fillets. Highly satisfactory results are also obtained with Airco No. 81 when welding "V" or "U" grooved sections. The heavy slag of this shielded arc electrode affords ample protection, floats dirt and

other foreign matter from the weld. Yet, after cooling, the slag is practically self-removing.

Weld deposits of Airco No. 81 Electrode exceed requirements of the specification for classification E 6020 filler metal by the A.W.S. and A.S.T.M. They regularly develop tensile strengths of 63,000 — 70,000 p.s.i. and elongations in 2 inches of 28% — 32%. Airco No. 81 Electrodes are readily available from any nearby Airco stockroom or distributor. So be sure to order a supply today.

Air Reduction

General Offices: 60 EAST 42nd ST., NEW YORK, N. Y.

IN TEXAS

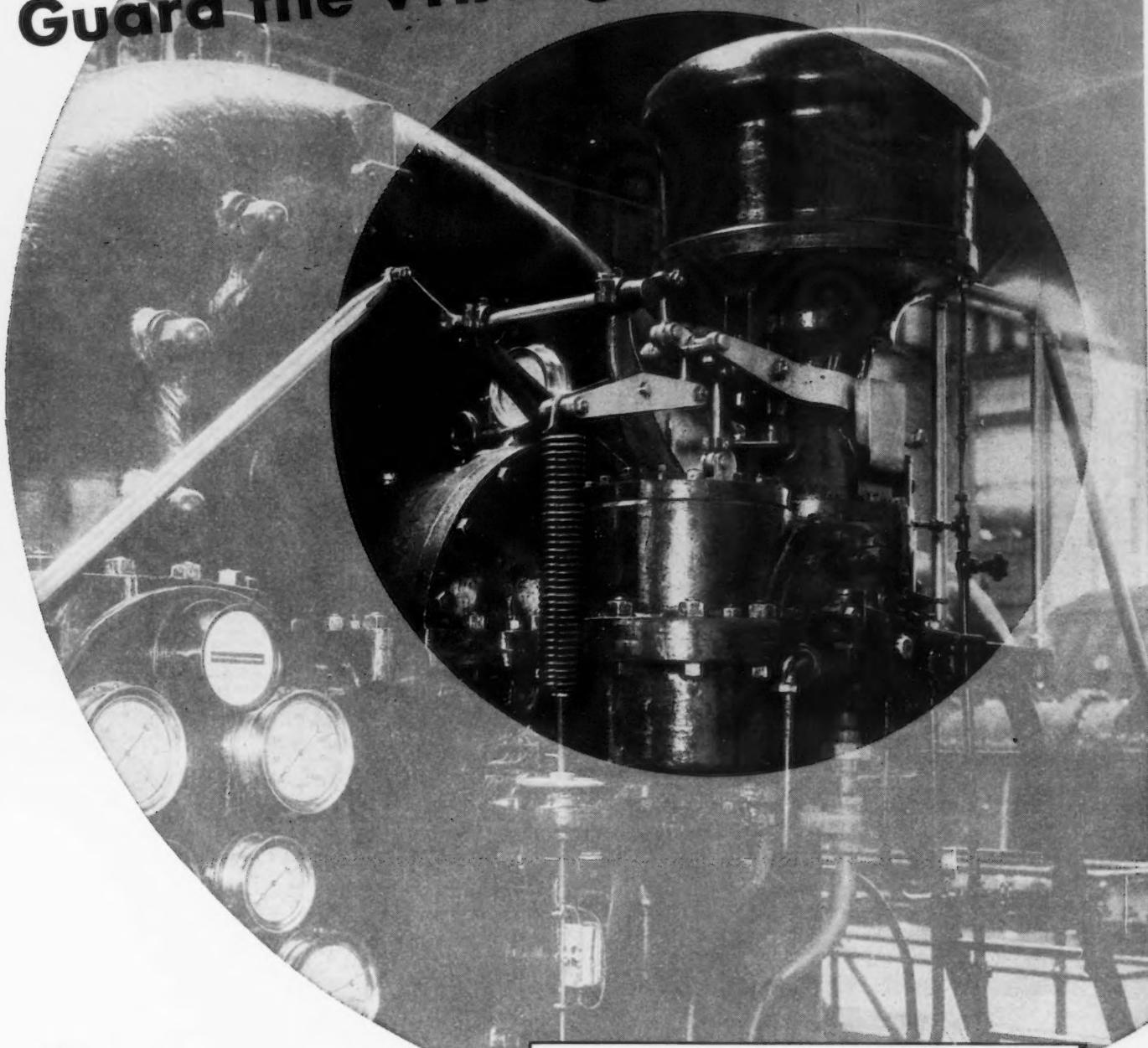
MAGNOLIA-AIRCO GAS PRODUCTS CO.

AIRCO DISTRICT OFFICES IN PRINCIPAL CITIES



Anything and Everything for GAS WELDING or CUTTING and ARC WELDING

Guard the VITAL governor zone—



SMALLER CLEARANCES of the governor parts in modern turbines *demand* a turbine oil that will prevent *rust*. And because that same oil must adequately lubricate bearings, gears and flexible couplings to guard against costly shutdowns, it should also have *superior oxidation stability . . . minimum foaming tendencies*. The new Shell Turbo Oil is the first to meet *all 3* of these requirements.

Call in the Shell man today and let him give you the *facts* about this revolutionary new turbine oil. You'll find his recommendations entirely practical—and made without obligation.

**—with the
turbine oil that
prevents rust**

**SHELL
TURBO OIL**



PRODUCTS INDEX

WHO MAKES IT

Here you find a weekly listing of hundreds of products with the names and addresses of manufacturers. The advertisements of these companies appear in *The Iron Age*.

Abrasives—Coated

Carborundum Co., The, Niagara Falls, N. Y.
Clover Mfg. Co., Norwalk, Conn.
Norton Co., Worcester, Mass.

Abrasives—Polishing

Abrasive Co., Philadelphia, Pa.
Bay State Abrasive Products Co., Westboro, Mass.
Carborundum Co., The, Niagara Falls, N. Y.
General Abrasive Co., Inc., Niagara Falls, New York
Norton Co., Worcester, Mass.
Siefen, J. J. Co., Detroit, Mich.

Abrasives—Steel Shot & Grit

American Foundry Equipment Co., The, 510 S. Byrkit St., Mishawaka, Ind.
Harrison Abrasive Corp., Manchester, N. H.
Pangborn Corporation, Hagerstown, Md.
Pittsburgh (Pa.) Crushed Steel Co.
Steel Shot & Grit Co., Boston, Mass.

Accumulators

Baldwin-Southwark Div., Baldwin Locomotive Wks., Philadelphia.
Logemann Bros. Co., Milwaukee, Wis.
Morgan Engineering Co., The, Alliance, Ohio.
Watson-Stillman Co., The, 103 Aldene Road, Roselle, N. J.
Wood, R. D., & Co., Philadelphia, Pa.

Acetylene

Air Reduction, 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

Acids—Pickling

American Chemical Paint Co., Ambler, Pa.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

Air Conditioning Equipment

American Blower Corp., 6000 Russell St., Detroit, Mich.

Alloys—See Ferroalloys

Alloys—Bismuth

Cerro De Pasco Copper Corp., 44 Wall St., New York City.

Alloys—Copper

American Brass Co., The, Waterbury, Conn.
Ampco Metal, Inc., Milwaukee, Wis.
Mallory, P. R., & Co., Inc., Indianapolis, Ind.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

Alloys—Corrosion & Abrasion Resistant

Coast Metals, Inc., Canton, Ohio.
Wall-Colmonoy Corp., Detroit, Mich.

Alloys—Low Melting Matrix

Cerro De Pasco Copper Corp., 44 Wall St., New York City.

Alloys—Magnesium

American Magnesium Corp., 1701 Gulf Bldg., Pittsburgh.
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

Alloys—Phosphor Bronze

American Brass Co., The, Waterbury Conn.
Ampco Metal, Inc., Milwaukee, Wis.
Phosphor Bronze Smelting Co., The, Philadelphia, Pa.

Aluminum

Aluminum Co. of America, Pittsburgh.

Angles, Beams, Channels and Tees

Bethlehem (Pa.) Steel Co.
Carnegie-Illinois Steel Corp., U. S. Steel Corp., Subsidiary, Pittsburgh & Chicago.
Columbia Steel Co., U. S. Steel Corp., Subsidiary, San Francisco, Calif.
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.
Holliday, W. J., & Co., Hammond, Ind.
Inland Steel Co., Chicago.

Jones & Laughlin Steel Corp., Pittsburgh.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Scully Steel Products Co., (U. S. Steel Corp., Subsidiary), Chicago.

Tennessee Coal, Iron & Railroad Co., (U. S. Steel Corp., Subsidiary), Birmingham, Ala.
Weirton (W. Va.) Steel Co.

Annealing Boxes

Lebanon (Pa.) Steel Foundry.
United Engineering & Foundry Co., Pittsburgh.

Arbors

Cincinnati (Ohio) Milling Mch. Co., The.
Morse Twist Drill & Mch. Co., New Bedford, Mass.

Asbestos

Carey, Phillip, Co., The, Cincinnati, Ohio.
Johns-Manville Corp., 22 East 40th St., N. Y. C.

Babbitt Metals

Bunting Brass & Bronze Co., The, Toledo, Ohio.
Cadmian, A. W., Mfg. Co., Pittsburgh.
Cramp Brass & Iron Foundries Div. of The Baldwin Locomotive Wks., Philadelphia.
National Bearing Metals Corp., Pittsburgh, Pa.
National Lead Co., 111 Bdway., N.Y.C.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.

Balancing Equipment

Gisholt Machine Co., Madison, Wis.
Sundstrand Machine Tool Co., Rockford, Ill.

Baling Presses

Baldwin-Southwark Div., Baldwin Locomotive Wks., Philadelphia, Pa.
Logemann Bros. Co., Milwaukee, Wis.
McKay Machine Co., The, Youngstown, Ohio.

Balls—Burnishing

Hartford (Conn.) Steel Ball Co., The.

Balls—Steel

Fafnir Bearing Co., The, New Britain, Conn.
Hartford (Conn.) Steel Ball Co., The.
New Departure Div., General Motors Sales Corp., Bristol, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Strom Steel Ball Co., Cicero, Ill.

Barrels—Burnishing & Tumbling

Baird Mch. Co., The, Bridgeport, Conn.
Hartford (Conn.) Steel Ball Co., The.
Whiting Corp., Harvey, Ill.

Bars—Aluminum

Aluminum Co. of America, Pittsburgh.

Bars—Brass, Bronze or Copper

American Brass Co., The, Waterbury, Conn.
Bunting, Brass & Bronze Co., The, Toledo, O.
Johnson Bronze Co., 505 So. Mill St., New Castle, Pa.
Revere Copper & Brass, Inc., 230 Park Ave., N. Y. C.

Bars—Cold Drawn

American Steel & Wire Co., (U. S. Steel Corp., Subsidiary), Cleveland.
Bliss & Laughlin, Inc., Harvey, Ill.; Buffalo, N. Y.
Crucible Steel Co. of America, Chrysler Bldg., New York City.
Holliday, W. J., & Co., Hammond, Ind.
Jones & Laughlin Steel Corp., Pittsburgh.

Kild Drawn Steel Co., Aliquippa, Pa.
Monarch Steel Co., Indianapolis, Ind.
Rathbone, A. B. & J., Palmer, Mass.
Union Drawn Steel Div., Republic Steel Corp., Massillon, Ohio.
Wyckoff Drawn Steel Co., Pittsburgh, Pa.

Bars—Concrete, Reinforcing

Bethlehem (Pa.) Steel Company.
Carnegie-Illinois Steel Corp., (U. S. Steel Corp., Subsidiary), Pittsburgh & Chicago.
Columbia Steel Co., (U. S. Steel Corp., Subsidiary), San Francisco, Calif.
Inland Steel Co., Chicago, Ill.
Jones & Laughlin Steel Corp., Pittsburgh.

Bars—Magnesium Alloys

American Magnesium Corp., 1701 Gulf Bldg., Pittsburgh.
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

Bars—Steel

Andrews Steel Co., The, Newport, Ky.
Beals-McCarthy & Rogers, Inc., Buffalo, New York.
Bethlehem (Pa.) Steel Company.
Brown-Wales Co., Boston, Mass.
Carnegie-Illinois Steel Corp., (U. S. Steel Corp., Subsidiary), Pittsburgh & Chicago.
Copperweld Steel Co., Warren, Ohio.
Crucible Steel Co. of America, Chrysler Bldg., New York City.
Great Lakes Steel Corp., Ecorse, Detroit.
Holliday, W. J., & Co., Hammond, Ind.
Inland Steel Co., Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.
Midvale Co., The, Nicetown, Phila., Pa.
Monarch Steel Co., Indianapolis, Ind.
Potts, Horace T., Co., Philadelphia, Pa.

Republie Steel Corp., Cleveland, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago.
Scully Steel Products Co., (U. S. Steel Corp., Subsidiary), Chicago.

Tennessee Coal, Iron & Railroad Co., (U. S. Steel Corp., Subsidiary), Birmingham, Ala.
Timken Roller Bearing Co., The, Canton, O.

Batteries—Storage

Edison Storage Battery Div. of Thomas A. Edison, Inc., West Orange, N. J.
Electric Storage Battery Co., The, Phila., Pa.
Philco, Battery Div., Phila., Pa.

Battery Chargers

Cutter-Hammer, Inc., Milwaukee.

Beams—See Angles

Bearings—Babbitt

Bunting Brass & Bronze Co., The, Toledo, Ohio.
Cadmian, A. W., Mfg. Co., Pittsburgh.
Johnson Bronze Co., 505 So. Mill St., New Castle, Pa.

Bearings—Ball

Bantam Bearings Corp., The, South Bend, Ind.
Bearings Co. of America, Lancaster, Pa.
Fafnir Bearing Co., The, New Britain, Conn.
Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.
New Departure Div., General Motors Sales Corp., Bristol, Conn.

Norma-Hoffmann Bearings Corp., Stamford, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Schatz Mfg. Co., Poughkeepsie, N. Y.
Torrington (Conn.) Company.

Bearings, Brass and Bronze

Amico Metal, Inc., Milwaukee, Wis.
Bunting Brass & Bronze Co., The, Toledo, O.
Johnson Bronze Co., 505 So. Mill St., New Castle, Pa.
Moraine Products Div. of General Motors Corp., Dayton, Ohio.
National Bearing Metals Corp., Pittsburgh.
Shenango-Penn Mold Co., Dover, Ohio.

Bearings—Needle

Bantam Bearings Corp., The, South Bend, Ind.
Torrington (Conn.) Company.

Bearings—Oilless

Bunting Brass & Bronze Co., The, Toledo, O.
Moraine Products Div. of General Motors Corp., Dayton, Ohio.
Rhoades, R. W., Metalline Co., Inc., Long Island City, N. Y.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.

Bearings—Roll Neck

Bantam Bearings Corp., The, South Bend, Ind.
Hyatt Bearings Div., General Motors Sales Corp., Harrison, N. J.
Morgan Construction Co., Worcester, Mass.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Timken Roller Bearing Co., The, Canton, O.

Bearings—Roller

Bantam Bearings Corp., The, South Bend, Ind.
Bower Roller Bearing Co., Detroit, Mich.
Hyatt Bearings Div., General Motors Sales Corp., Harrison, N. J.
Link-Belt Co., 519 North Holmes Ave., Indianapolis, Ind.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
Rollway Bearing Co., Inc., Syracuse, N. Y.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Timken Roller Bearing Co., The, Canton, O.

Bearings—Roller Tapered

Bantam Bearings Corp., The, South Bend, Ind.
Bower Roller Bearing Co., Detroit, Mich.
Timken Roller Bearing Co., The, Canton, O.

Bearings—Rolling Mill Equipment

Bantam Bearings Corp., The, South Bend, Ind.
Hyatt Bearings Div., General Motors Sales Corp., Harrison, N. J.
Morgan Construction Co., Worcester, Mass.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Timken Roller Bearing Co., The, Canton, O.

Bearings—Shaft Hanger

Dodge Mfg. Corp., Mishawaka, Ind.
Fafnir Bearing Co., The, New Britain, Conn.
Hyatt Bearings Div., General Motors Sales Corp., Harrison, N. J.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
Rollway Bearing Co., Inc., Syracuse, N. Y.
SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
Triangle Mfg. Co., Oshkosh, Wis.

Bearings—Thrust

Bantam Bearings Corp., The, South Bend, Ind.
Bearings Co. of America, Lancaster, Pa.

PRODUCTS INDEX

- Fafnir Bearing Co., The, New Britain, Conn.
 Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.
 Hyatt Bearings Div., General Motors Sales Corp., Harrison, N. J.
 New Departure Div., General Motors Sales Corp., Bristol, Conn.
 Norma-Hoffmann Bearings Corp., Stamford, Conn.
 Rollway Bearing Co., Inc., Syracuse, N. Y.
 SKF Industries, Inc., Front St. & Erie Ave., Phila., Pa.
 Schatz Mfg. Co., The, Poughkeepsie, N. Y.
 Timken Roller Bearing Co., The, Canton, O.
- Belt—Conveyor, Elevator**
 Hewitt Rubber Corp., Buffalo, N. Y.
 Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.
- Belting—Leather**
 Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
 Houghton, E. F., & Co., Philadelphia, Pa.
- Belting—Metal, Conveyor, High and Low Temperature**
 Wickwire Spencer Steel Co., 500 Fifth Ave., N. Y. C.
- Belting—Rubber**
 Hewitt Rubber Corp., Buffalo, N. Y.
 Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.
- Belts—V-Type**
 Allis-Chalmers Mfg. Co., Milwaukee.
 Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.
 Multiple V-Belt Drive Assn., Chicago, Ill.
- Bench Legs—Steel**
 New Britain-Gridley Machine Div., The New Britain Machine Co., New Britain, Conn.
 Standard Pressed Steel Co., Jenkintown, Pa.
- Benches—Steel Work**
 Standard Pressed Steel Co., Jenkintown, Pa.
- Bending Machines—Hand, Band and Angle**
 Excelis Tool & Mfg. Co., E. St. Louis, Ill.
- Bending Machines**
 Buffalo (N. Y.) Forge Co., 492 Broadway.
 Cincinnati (Ohio) Shaper Co., The, Cleveland Crane & Engineering Co., The, Steelweld Mehry, Div., 1115 East 283rd St., Wickliffe, Ohio.
 Cleveland (Ohio) Punch & Shear Works Co., The.
 Drels & Krump Mfg. Co., Chicago, Ill.
 Niagara Machine & Tool Works, Buffalo, N. Y.
 Yoder Co., The, Cleveland, Ohio.
- Benzol Recovery Plants**
 Koppers Co., Engineering & Construction Div., Pittsburgh.
- Beryllium Copper**
 American Brass Co., The, Waterbury Conn.
 Ampco Metal, Inc., Milwaukee, Wis.
- Billets—Alloy & Carbon Steel**
 Alan Wood Steel Co., Conshohocken, Pa.
 Andrews Steel Co., The, Newport, Ky.
 Bethlehem (Pa.) Steel Company.
 Copperweld Steel Co., Warren, Ohio.
 Harrisburg (Pa.) Steel Corp.
 Holliday, W. J., & Co., Hammond, Ind.
 Inland Steel Co., Chicago, Ill.
 Jones & Laughlin Steel Corp., Pittsburgh.
 Midvale Co., The, Nicetown, Phila., Pa.
 Pittsburgh (Pa.) Steel Co.
 Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
- Billets—Forging**
 Alan Wood Steel Co., Conshohocken, Pa.
 Andrews Steel Co., The, Newport, Ky.
 Harrisburg (Pa.) Steel Corp.
 Pittsburgh (Pa.) Steel Co.
 Republic Steel Corp., Cleveland, Ohio.
- Billets—Re-rolling Facilities**
 Nicetown Plate Washer Co., Inc., Philadelphia, Pa.
- Blocking Salts, for Steel**
 Alrose Chemical Co., Cranston, Providence, R. I.
 Heath bath Corp., Springfield, Mass.
 Mitchell-Bradford Chemical Co., The, Bridgeport, Conn.
- Blast Cleaning Equipment**
 American Foundry Equipment Co., The, 510 S. Byrkit St., Mishawaka, Ind.
 Pangborn Corporation, Hagerstown, Md.
 Ruemelin Mfg. Co., 3870 N. Palmer St., Milwaukee, Wis.
- Blast Furnace Plants—Complete**
 Brassert, H. A., & Co., Pittsburgh, Pa.
 McKee, Arthur G., & Co., Cleveland.
- Blast Furnace Specialties**
 McKee, Arthur G., & Co., Cleveland.
- Blast Gates**
 Rockwell, W. S., Co., 50 Church St., N. Y. C.
- Blocks—Chain**
 Ford Chain Block Div., American Chain & Cable Co., Inc., Philadelphia, Pa.
 Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.
- Blowers**
 Allis-Chalmers Mfg. Co., Milwaukee, Wis.
 American Blower Corp., 6000 Russell St., Detroit, Mich.
 North American Mfg. Co., The, Cleveland, Ohio.
 Roots-Connerville Blower Corp., Connerville, Ind.
- Blowpipes—Soldering, Heating**
 Weldit Acetylene Co., Detroit, Mich.
- Blue Printing Machines & Paper**
 Pease, C. F., Company, The, 2695 W. Irving Pk. Road, Chicago, Ill.
- Boilers**
 Babcock & Wilcox Co., The, 85 Liberty St., N. Y. C.
- Bolt and Nut Machinery**
 Ajax Mfg. Co., The, Cleveland, Ohio.
 Landis Machine Co., Waynesboro, Pa.
 Waterbury (Ct.) Farrel Fdry. & Mch. Co., The.
- Bolt & Rivet Clippers**
 Helwig Mfg. Co., St. Paul, Minn.
- Bolts—Special**
 Bethlehem (Pa.) Steel Co.
 Cleveland (Ohio) Cap Screw Co., The.
 Lamson & Sessions Co., The, Cleveland.
 Republic Steel Corp., Cleveland, Ohio.
 Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
- Bolts—Stove**
 Cleveland (Ohio) Cap Screw Co., The.
 Lamson & Sessions Co., The, Cleveland.
 Progressive Mfg. Co., Torrington, Conn.
 Republic Steel Corp., Cleveland, Ohio.
 Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
- Bolts—Stove, Recessed Head**
 American Screw Co., Providence, R. I.
- Bolts—Track**
 Bethlehem (Pa.) Steel Co.
 Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
 Lamson & Sessions Co., The, Cleveland, Ohio.
 Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
- Bolts and Nuts**
 American Screw Co., Providence, R. I.
 Bethlehem (Pa.) Steel Company.
 Clark Bros. Bolt Co., Milldale, Conn.
 Cleveland (Ohio) Cap Screw Co., The.
 Lamson & Sessions Co., The, Cleveland.
 Republic Steel Corp., Cleveland, Ohio.
 Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
 Triplex Screw Co., Cleveland.
- Boring Bars**
 Bullard Co., The, Bridgeport, Conn.
 Carboley Co., Inc., 11153 East 8-Mile Road, Detroit, Michigan.
 Galring Tool Co., The, Detroit.
 Gisholt Machine Co., Madison, Wisconsin.
- Boring, Drilling & Milling Machines—Horizontal**
 Giddings & Lewis Machine Tool Co., Fond Du Lac, Wis.
 Hill-Clarke Mehry, Co., 647 W. Washington Blvd., Chicago.
 Lucas Machine Tool Co., Cleveland.
 Sellers, William, & Co., Inc., 1620 Hamilton St., Philadelphia, Pa.
- Boring & Drilling Machines—Vertical**
 Bullard Co., The, Bridgeport, Conn.
- Boring Machines—Diamond & Carbide Tools**
 Ex-Cell-O Corp., 1210 Oakman Blvd., Detroit, Mich.
 Heald Machine Co., Worcester, Mass.
 Sheffield Corp., The, Gage Div., Dayton, Ohio.



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PRODUCTS INDEX

Boring Machines—Jig

Cincinnati (Ohio) Bickford Tool Co.,
The Pratt & Whitney Div. Niles-Bement-Pond Co., West Hartford, Conn.

Boring & Turning Mills—Vertical

Bullard Co., The, Bridgeport, Conn.
Cincinnati (Ohio) Planer Co.
Ganey Machinery Co., Buffalo, New York.
Sellers, William, & Co., Inc., 1820 Hamilton St., Philadelphia, Pa.

Boxes—Shop

All-Steel-Equip Co., Inc., 702 John St., Aurora, Ill.

Boxes—Stacking

All-Steel-Equip Co., Inc., 702 John St., Aurora, Ill.
Union Metal Mfg. Co., The, Canton, Ohio.

Brake Lining & Blocks—Asbestos

Johns-Manville Corp., 22 E. 40th St., N. Y. C.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

Brakes—Electric

Clark Controller Co., The, Cleveland.
Cutler-Hammer, Inc., Milwaukee.
Electric Controller & Mfg. Co., The, Cleveland.

Brakes—Magnetic

Searns Magnetic Mfg. Co., 635 So. 28th St., Milwaukee.

Brakes—Metal Forming

Birdsboro (Pa.) Steel Foundry & Machine Co.
Bryant Machinery & Engineering Co., Chicago.

Circuits—Metal Forming

Cincinnati (Ohio) Shaper Co., The, Cleveland Crane & Engineering Co., The, Steelweld Mchry. Div., 1115 East 23rd St., Wickliffe, Ohio.
Dreis & Krump Mfg. Co., Chicago.
Ferracute Machine Co., Bridgeton, New Jersey.

Schatz Mfg. Co., The, Poughkeepsie, N. Y.

Brick—Insulating

Babcock & Wilcox Co., The, 85 Liberty St., N. Y. C.
Carborundum Co., The, Perth Amboy, N. J.

Broaches

Colonial Broach Co., Detroit.
Ex-Cell-O Corp., 1210 Oakman Blvd., Detroit, Mich.
National Broach & Machine Co., Detroit, Mich.

Broaching Machines

Bullard Co., The, Bridgeport, Conn.
Cincinnati (Ohio) Milling Mch. Co., The.
Colonial Broach Co., Detroit.
Lucas Machine Tool Co., Cleveland.
Oilgear Co., The, 1311 W. Bruce St., Milwaukee.

Bronze—Phosphor

American Brass Co., The, Waterbury, Conn.
Bunting Brass & Bronze Co., The, Toledo, Ohio.
Revere Copper & Brass, Inc., 230 Park Ave., New York City.

Brushes—Industrial

National Carbon Co., Inc., Carbon Sales Div., Cleveland, Ohio.
Osborn Manufacturing Co., The, Cleveland.
Pittsburgh Plate Glass Co., Brush Div., Baltimore, Md.

Buckets—Clamshell, Grab, Dragline

Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Cullen-Friesstedt Co., 1303 S. Kilbourn Ave., Chicago.
Hayward Co., The, 50 Church St., N. Y. C.
Heyl & Patterson, Inc., Pittsburgh.
Industrial Brownhoist Corp., Bay City, Mich.
Wellman Engineering Co., The, Cleveland.

Buffers—Portable

Black & Decker Mfg. Co., The, Towson, Md.
Roto Tool Co., The, Cleveland, Ohio.

Buildings & Bridges—Steel

American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
American Rolling Mill Co., The, Mid-dletown, Ohio.
Belmont Iron Works, Philadelphia.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Iron & Steel Products, Inc., Chicago.

Bulldozers

Ajax Mfg. Co., The, Cleveland, Ohio.
Cleveland Crane & Engineering Co., The, Steelweld Mchry. Div., 1115 East 283rd St., Wickliffe, Ohio.

Burners—Oil or Gas

Babcock & Wilcox Co., The, 85 Liberty St., New York City.
North American Mfg. Co., The, Cleveland, Ohio.
R-S Products Corp., Philadelphia, Pa.
Stewart Furnace Div., Chicago Flexible Shaft Co., Chicago, Ill.
Surface Combustion Corp., 2375 Dorr St., Toledo, Ohio.
Wean Engineering Co., Inc., The, Warren, Ohio.
Wilson Lee Sales Corp., Cleveland, Ohio.

Burnishing Machines—Gear

Sheffield Corp., The, Gage Div., Dayton, Ohio.

Burring Machines

National Broach & Machine Co., Detroit, Mich.
Sheffield Corp., The, Gage Div., Dayton, Ohio.

Bushings—Bronze

Ampco Metal, Inc., Milwaukee, Wis.
Bunting Brass & Bronze Co., The, Toledo, O.
Johnson Bronze Co., 505 So. Mill St., New Castle, Pa.
Shenango-Penn Mold Co., Dover, Ohio.

Bushings—Drill Jig

Ex-Cell-O Corp., 1210 Oakman Blvd., Detroit, Mich.

Bushings—Oilless

Rhoades, R. W., Metaline Co., Inc., Long Island City, N. Y.

By-Product Plants

Koppers Co., Engineering & Construction Div., Pittsburgh.

Cabinets—Filing

All-Steel-Equip Co., Inc., 702 John St., Aurora, Ill.

Cabinets—Wardrobe

All-Steel-Equip Co., Inc., 702 John St., Aurora, Ill.

Cable—Electric

American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Cleveland, Ohio.
General Electric Co., Schenectady, N. Y.
Lincoln Electric Co., The, Cleveland.
Roebeling's, John A., Sons Co., Trenton, N. J.

Calcium Metal & Alloys

Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

Cams

Hartford (Conn.) Special Machinery Co., The.

Car Movers—Electric, Gasoline & Diesel

Silent Hoist Winch & Crane Co., 851-63rd St., Brooklyn, N. Y.

Carbide

Air Reduction, 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

Carbon—Brick & Powder

National Carbon Co., Inc., Carbon Sales Div., Cleveland, Ohio.

Cars—Dump

Pressed Steel Car Co., Inc., Koppel Div., Pittsburgh, Pa.

Cars—Industrial and Mining

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Heyl & Patterson, Inc., Pittsburgh.
Pressed Steel Car Co., Inc., Koppel Div., Pittsburgh, Pa.

Cars—Ladle, Cinder & Slag

Pressed Steel Car Co., Inc., Koppel Div., Pittsburgh, Pa.

Cars—Passenger, Railway

Budd, Edward G., Mfg. Co., Philadelphia, Pa.
Iron & Steel Products, Inc., Chicago.

Casters

Darnell Corp., Ltd., Long Beach, Calif.

Castings—Acid or Heat Resisting

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
Ampco Metal, Inc., Milwaukee, Wis.
Atlas Stainless Steel Castings Div. of Atlas Foundry Co., Irvington, N. J.
Coast Metals, Inc., Canton, Ohio.
Cramp Brass & Iron Foundries Div. of The Baldwin Locomotive Wks., Philadelphia.
Hoskins Mfg. Co., Detroit, Mich.
Jewell Alloy & Malleable Co., Inc., 1173 Hertel Ave., Buffalo, N. Y.
Lebanon (Pa.) Steel Foundry.

Castings—Monel & Nickel

Cramp Brass & Iron Foundries Div. of The Baldwin Locomotive Wks., Philadelphia.

Castings—Phosphor Bronze

Phosphor Bronze Smelting Co., The, Philadelphia, Pa.

Meehanite Research Institute, Pittsburgh, Pa.
Michigan Products Corp., Michigan City, Ind.
Midvale Co., The, Nicetown, Phila., Pa.
Ohio Steel Foundry Co., Lima, Ohio.
Wall-Colmonoy Corp., Detroit, Mich.
Wheeling (W. Va.) Bronze Casting Co.

Castings—Alloy Steel

Advance Foundry Co., The, Dayton, Ohio.
Birdsboro (Pa.) Steel Foundry & Machine Co.
Hartford (Conn.) Electric Steel Corp.
Lebanon (Pa.) Steel Foundry.
Mackintosh-Hemphill Co., Pittsburgh, Michigan Products Corp., Michigan City, Ind.
National-Erie Corp., Erie, Pa.
Taylor-Wharton Iron & Steel Co., High Bridge, New Jersey.
Unitcast Corp., Toledo, Ohio.

Castings—Brass, Bronze, Copper or Aluminum

Aluminum Co. of America, Pittsburgh.
Bronze Tablet Foundry, Inc., 570 Broadway, New York City.
Bunting Brass & Bronze Co., The, Toledo, Ohio.

Cadman, A. W., Mfg. Co., Pittsburgh.
Cramp Brass & Iron Foundries Div. of The Baldwin Locomotive Wks., Philadelphia.

Koppers Co., Bartlett Hayward Div., Baltimore, Md.
National Bearing Metals Corp., Pittsburgh.

Shenango-Penn Mold Co., Dover, Ohio.
Spencer's, I. S., Sons, Inc., Guilford, Ct.

Union Brass & Metal Mfg. Co., St. Paul, Minn.
Wheeling (W. Va.) Bronze Casting Co.

Castings—Die

Aluminum Co. of America, Pittsburgh.
Titan Metal Mfg. Co., Bellefonte, Pa.

Castings—Electric Steel

Continental Roll & Steel Foundry Co., East Chicago, Ind.
Crucible Steel Castings Co., Lansdowne, Pa.

Lebanon (Pa.) Steel Foundry.
National-Erie Corp., Erie, Pa.
Ohio Steel Foundry Co., Lima, Ohio.
Unitcast Corp., Toledo, Ohio.

Castings—Gray Iron and Semi-Steel

Advance Foundry Co., The, Dayton, Ohio.

Allis-Chalmers Mfg. Co., Milwaukee, Wis.

American Engineering Co., Philadelphia.

Cox & Sons Co., The, Bridgeton, N. J.

Cramp Brass & Iron Foundries Div. of The Baldwin Locomotive Wks., Philadelphia.

Etna Machine Co., The, Toledo, Ohio.

Kelly Foundry & Machine Co., Elkins, W. Va.

Koppers Co., Bartlett Hayward Div., Baltimore, Md.

Lobdell Car Wheel Co., Wilmington, Del.

National Roll & Fdry. Co., Avonmore, Pa.

North Wales (Pa.) Mach Co., Inc.

Spencer's, I. S. Sons, Inc., Guilford, Ct.

Castings—High Test & Alloy Iron

Cramp Brass & Iron Foundries Div. of The Baldwin Locomotive Wks., Philadelphia.

Meehanite Research Institute, Pittsburgh, Pa.

Michigan Products Corp., Michigan City, Ind.

Castings—Magnesium Alloys

American Magnesium Corp., 1701 Gulf Bldg., Pittsburgh.

Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

Castings—Malleable

Jewell Alloy & Malleable Co., Inc., 1173 Hertel Ave., Buffalo, N. Y.

Lake City Malleable Co., The, 5100 Lakeside Ave., Cleveland, Ohio.

Peoria (Ill.) Malleable Castings Co.

Castings—Manganese Steel

Taylor-Wharton Iron & Steel Co., High Bridge, New Jersey.

Castings—Meehanite Metal

Meehanite Research Institute, Pittsburgh, Pa.

Castings—Monel & Nickel

Cramp Brass & Iron Foundries Div. of The Baldwin Locomotive Wks., Philadelphia.

Castings—Phosphor Bronze

Phosphor Bronze Smelting Co., The, Philadelphia, Pa.

Castings—Steel

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.

American Rolling Mill Co., The, Mid-dletown, Ohio.

Bethlehem (Pa.) Steel Company.

Birdsboro (Pa.) Steel Foundry & Machine Co.

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Columbus Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.

Continental Roll & Steel Foundry Co., East Chicago, Ind.

Crucible Steel Castings, Lansdowne, Pa.

Hartford (Conn.) Electric Steel Corp.

Jewell Alloy & Malleable Co., Inc., 1173 Hertel Ave., Buffalo, N. Y.

Lebanon (Pa.) Steel Foundry.

Mackintosh-Hemphill Co., Pittsburgh.

Mesta Mch. Co., Pittsburgh.

Michigan Products Corp., Michigan City, Ind.

National-Erie Corp., Erie, Pa.

Ohio Steel Foundry Co., Lima, Ohio.

Standard Steel Wks. Div. The Baldwin Locomotive Works, Phila., Pa.

Strong Steel Foundry Co., Buffalo, N. Y.

Unitcast Corp., Toledo, Ohio.

Castings—Wear Resisting

Coast Metals, Inc., Canton, Ohio.

Meehanite Research Institute, Pittsburgh, Pa.

Taylor-Wharton Iron & Steel Co., High Bridge, New Jersey.

Wall-Colmonoy Corp., Detroit Mich.

Cement—Acid-Proof

Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

Cement—Refractory

Babcock & Wilcox Co., The, 85 Liberty St., New York City.

Carborundum Co., The, Perth Amboy, N. J.

Holden, A. F., Co., The, New Haven, Conn.

Johns-Manville Corp., 22 East 40th St., New York City.

Centering Machines

Hendey Machine Co., Torrington, Conn.

Jones & Lamson Machine Co., Springfield, Vt.

Sundstrand Machine Tool Co., Rockford, Ill.

Chains—Conveyor & Elevator

Heyl & Patterson, Inc., Pittsburgh.

Link-Belt Co., 220 So. Belmont Ave., Indianapolis, Ind.

Morse Chain Co., Ithaca, N. Y.

Whitney Chain & Mfg. Co., Hartford, Ct.

Chains—Power Transmission

Link-Belt Co., 220 So. Belmont Ave., Indianapolis, Ind.

Morse Chain Co., Ithaca, N. Y.

Whitney Chain & Mfg. Co., Hartford, Conn.

Chains—Welded

American Chain & Cable Co., Inc., York, Pa.

Chairs—Steel, Office

Harter Corp., Sturgis, Mich.

Chamfering Machines (Gear)

Cross Gear & Machine Co., Detroit, Mich.

Sheffield Corp., The, Gage Div., Dayton, Ohio.

Channels—See Angles
Checks—Metal

Cunningham, M. E., Co., Pittsburgh, Pa.

Noble & Westbrook Mfg. Co., The, E. Hartford, Conn.

Chemicals—Industrial

Koppers Co., Tar & Chemical Div., Pittsburgh, Pa.

Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

Chisels

PRODUCTS INDEX

Potter & Johnston Machine Co., Pawtucket, R. I.

Chucks—Air Operated

Logansport (Ind.) Machine, Inc., Tomkins-Johnson Co., The, Jackson, Mich.

Chucks—Drill

Cleveland (Ohio) Twist Drill Co., The, Cushman Chuck Co., Hartford, Conn., Morse Twist Drill & Mach Co., New Bedford, Mass., North Bros. Mfg. Co., Philadelphia, Pa.

Chucks—Lathe

Cushman Chuck Co., Hartford, Conn., Gisholt Machine Co., Madison, Wis., Jones & Lamson Machine Co., Springfield, Vt.

Chucks—Magnetic

Brown & Sharpe Mfg. Co., Providence, R. I., Heald Machine Co., Worcester, Mass., Taft-Pelzer Mfg. Co., The, Woonsocket, R. I.

Clamps

Detroit (Mich.) Stamping Co.

Cleaners—Metal

American Chemical Paint Co., Ambler, Pa., Ford, J. B., Sales Co., The, Wyandotte, Mich., Holden, A. F., Co., The, New Haven, Conn., Houghton, E. F., & Co., Philadelphia, Pa., Oakite Products, Inc., 22 Thames St., New York City, Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

Cleaning Equipment (Metal)—Electro-Chemical

Bullard-Dunn Div., The Bullard Co., Bridgeport, Conn.

Clutches

Dodge Mfg. Corp., Mishawaka, Ind., Fairbanks, Morse & Co., Chicago, Falls Clutch & Mchry. Co., The, Cuyahoga Falls, Ohio, Hilliard Corp., The, Elmira, New York, Morse Chain Co., Ithaca, N. Y., Twin Disc Clutch Co., Racine, Wis.

Clutches—Magnetic

Cutter-Hammer, Inc., Milwaukee, Dings Magnetic Separator Co., 517 E. Smith St., Milwaukee, Stearns Magnetic Mfr. Co., 635 So. 28th St., Milwaukee.

Coal

Cleveland-Cliffs Iron Co., The, Cleveland, Ohio, Koppers Coal Co., The, Pittsburgh, Pickands Mather & Co., Cleveland, Ohio, Wleman & Ward Co., The, Pittsburgh, Pa.

Coal, Ore & Ash Handling Machinery

Heyl & Patterson, Inc., Pittsburgh, Link-Belt Co., 300 West Pershing Road, Chicago, Ill.

Cobalt Metal

Central Trading Corp., 511 Fifth Ave., N. Y. C.

Coiling Machinery—Wire Spring

Torrington (Conn.) Mfg. Co., The.

Coke—Metallurgical

Cleveland-Cliffs Iron Co., The, Cleveland, Ohio, Pickands Mather & Co., Cleveland, Ohio, Wleman & Ward Co., The, Pittsburgh, Pa.

Coke Oven Machinery

Koppers Co., Engineering & Construction Div., Pittsburgh.

Cold Roll Forming Machines

McKay Machine Co., The, Youngstown, Ohio, Yoder Co., The, Cleveland, Ohio.

Collets

Hardinge Brothers, Inc., Elmira, New York.

Columbium

Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

Combustion Controls

Brown Instrument Co., The, Philadelphia, Pa., Leeds & Northrup Co., 4956 Stenton Ave., Philadelphia, Morgan Construction Co., Worcester, Mass., North American Mfg. Co., The, Cleveland, Ohio.

Compounds—Drawing and Cutting

Gulf Oil Corp., Gulf Refining Co., Pittsburgh, Houghton, E. F., & Co., Philadelphia, Pa., Oakite Products, Inc., 22 Thames St., N. Y. C., Penola, Inc., Pittsburgh, Pa., Socony-Vacuum Oil Co., Inc., 26 Broadway, New York City, Standard Oil Co. (Indiana), Chicago, Stuart, D. A., Oil Co., Ltd., Chicago, Ill., Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

Compressors—Air

Allis-Chalmers Mfg. Co., Milwaukee, Wis., Curtis Pneumatic Mchry. Co., 1948 Kienlen Ave., St. Louis, Mo., Fairbanks, Morse & Co., Chicago.

Condensers—Surface & Jet

Allis-Chalmers Mfg. Co., Milwaukee, Wis., Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Controllers—Electric

Allis-Chalmers Mfg. Co., Milwaukee, Wis., Clark Controller Co., The, Cleveland, Cutler-Hammer, Inc., Milwaukee, Electric Controller & Mfg. Co., The, Cleveland, General Electric Co., Schenectady, N. Y.

Conveying and Elevating Machinery

Heyl & Patterson, Inc., Pittsburgh, Link-Belt Co., 300 West Pershing Road, Chicago, Ill., Logan Co., Inc., Louisville, Ky., Mathews Conveyer Co., Ellwood City, Pa.

Conveyor Worms

Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.

Conveyors—Gravity

Logan Co., Inc., Louisville, Ky., Mathews Conveyer Co., Ellwood City, Pa.

Conveyors—Monorail

American Monorail Co., The, Cleveland, Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., 1115 East 283rd St., Wickliffe, Ohio.

Coolers—For Cutting Oils

Harrison Radiator Div. General Motors Corp., Lockport, N. Y.

Core Oil

Houghton, E. F., & Co., Philadelphia, Pa., Penola, Inc., Pittsburgh, Pa., Socony-Vacuum Oil Co., Inc., 28 Broadway, New York City, Sun Oil Co., Philadelphia, Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

Cotter Pins

American Chain & Cable Co., Inc., York, Pa., Hindley Mfg. Co., Valley Falls, R. I., Hubbard, M. D., Spring Co., 329 Central Ave., Pontiac, Mich., Lamson & Sessions Co., The, Cleveland, Western Wire Prods. Co., St. Louis, Mo.

Counterbores

Carboly Co., Inc., 11153 East 8-Mile Road, Detroit, Michigan, Cleveland (Ohio) Twist Drill Co., The, Ex-Cell-O Corp., 1210 Oakman Blvd., Detroit, Mich., Galring Tool Co., The, Detroit, Morse Twist Drill & Mch. Co., New Bedford, Mass.

Counting Devices

Veeder-Root, Inc., Hartford, Conn.

Couplings—Flexible & Shaft

Ajax Flexible Coupling Co., Westfield, N. Y., American Flexible Coupling Co., Erie, Pa., Hilliard Corp., The, Elmira, New York.



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PRODUCTS INDEX

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Lovejoy Flexible Coupling Co., 4979 Lake St., Chicago, Ill.
Morse Chain Co., Ithaca, N. Y.
Poole Foundry & Mfg. Co., Baltimore, Md.
Twin Disc Clutch Co., Racine, Wis.

Couplings—Pipe
Champion Machine & Forging Co., The, Cleveland, Ohio.
Harrisburg (Pa.) Steel Corp.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

Cranes—Crawling
Cullen-Friestd Co., 1303 S. Kilbourn Ave., Chicago.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Industrial Brownhoist Corp., Bay City, Mich.
Ohio Locomotive Crane Co., The, Bucyrus, Ohio.

Cranes—Electric Traveling
Armel, James P., Pittsburgh.
Cleveland Crane & Engineering Co., 1115 East 283rd St., Wickliffe, Ohio.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., 1115 East 283rd St., Wickliffe, Ohio.
Curtis Pneumatic Mchry. Co., 1948 Kienlen Ave., St. Louis, Mo.
Euclid Crane & Hoist Co., The, Euclid, O.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee, Wis.
Morgan Engineering Co., The, Alliance, O.
Northern Engineering Works, Detroit, Mich.
Reading (Pa.) Chain & Block Corp.
Robbins & Myers, Inc., Springfield.
Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.
Whiting Corp., Harvey, Ill.

Cranes—Gantry
Cleveland Crane & Engineering Co., 1115 East 283rd St., Wickliffe, Ohio.
Euclid Crane & Hoist Co., The, Euclid, O.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Morgan Engineering Co., The, Alliance, O.
Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.
Whiting Corp., Harvey, Ill.

Cranes—Hand
American Monorail Co., The, Cleveland.
Cleveland Crane & Engineering Co., 1115 East 283rd St., Wickliffe, Ohio.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., 1115 East 283rd St., Wickliffe, Ohio.
Curtis Pneumatic Mchry. Co., 1948 Kienlen Ave., St. Louis, Mo.
Euclid Crane & Hoist Co., The, Euclid, O.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Industrial Brownhoist Corp., Bay City, Mich.
Northern Engineering Works, Detroit.
Reading (Pa.) Chain & Block Corp.
Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.
Whiting Corp., Harvey, Ill.

Cranes—Jib
American Monorail Co., The, Cleveland.
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., 1115 East 283rd St., Wickliffe, Ohio.
Euclid Crane & Hoist Co., The, Euclid, O.
Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.
Whiting Corp., Harvey, Ill.

Cranes—Locomotive
Cullen-Friestd Co., 1303 S. Kilbourn Ave., Chicago.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee.
Industrial Brownhoist Corp., Bay City, Mich.
Ohio Locomotive Crane Co., The, Bucyrus, O.
Silent Hoist Winch & Crane Co., 851-63rd St., Brooklyn, N. Y.

Cranes—Monorail
American Monorail Co., The, Cleveland.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., 1115 East 283rd St., Wickliffe, Ohio.
Euclid Crane & Hoist Co., The, Euclid, O.
Northern Engineering Works, Detroit.
Reading (Pa.) Chain & Block Corp.

Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.
Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

Cranes—Portable
Canton Foundry & Mach. Co., The, Div. of The Hill Acme Co., 6400 Breakwater Ave., Cleveland, Ohio.

Cranes—Tractor Type, Gasoline & Diesel
Silent Hoist Winch & Crane Co., 851-63rd St., Brooklyn, N. Y.

Crankshafts
Bay City Forge Co., Erie, Pa.
Midvale Co., The, Nicetown, Phila., Pa.
Transue & Williams Steel Forging Corp., Alliance, Ohio.

Crushers
American Pulverizer Co., 1439 Macklind Ave., St. Louis, Mo.

Cupola Charging Equipment
Atlas Car & Mfg. Co., The, Cleveland, Ohio.
Lake Erie Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y.

Cutters & Burrs—Diemakers'
Chicago (Ill.) Wheel & Mfg. Co., 110 W. Monroe St.

Cutters—Die Sinking
Pratt & Whitney Div. Niles-Bement-Pond Co., West Hartford, Conn.
Tomkins-Johnson Co., The, Jackson, Mich.

Cutters—Keyseating
Davis Keyseater Co., 400 Exchange St., Rochester, N. Y.

Cutters—Milling
Brown & Sharpe Mfg. Co., Providence, R. I.
Carboly Co., Inc., 11153 East 8-Mile Road, Detroit, Michigan.
Cleveland (Ohio) Twist Drill Co., The, Gairing Tool Co., The, Detroit.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Div. Niles-Bement-Pond Co., West Hartford, Conn.
Victor Machinery Exchange, 251 Centre St., N. Y. C.

Cutting Compounds—See Compounds

Cutting-Off Machines
Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Bardoni & Oliver, Inc., Cleveland.
Cox & Sons Co., The, Bridgeton, N. J.
Landis Mch. Co., Wayneboro, Pa.

Cutting-Off Machines—Abrasive
Challenge Machinery Co., Grand Haven, Mich.
Tabor Mfg. Co., Phila.

Cutting-Off Machines—Cold Saw
Espin-Lucas Mch. Wks., Philadelphia.

Cutting-Off Wheels
Carborundum Co., The, Niagara Falls, N. Y.

Cylinders—Air & Hydraulic
Hannifin Mfg. Co., Chicago, Ill.
Logansport (Ind.) Machine, Inc.
Olgeair Co., The, 1311 W. Bruce St., Milwaukee, Wis.
Taylor-Wharton Iron & Steel Co., High Bridge, N. J.
Tomkins-Johnson Co., The, Jackson, Mich.

Cylinders—Seamless
Harrisburg (Pa.) Steel Corp.
Midvale Co., The, Nicetown, Phila., Pa.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Taylor-Wharton Iron & Steel Co., High Bridge, N. J.

Degreasing Compounds
Pennsylvania Salt Mfg. Co., Philadelphia.

Die Blocks—Drop Hammer
Heppenstall Co., Pittsburgh.

Die Casting Machines
Reed-Prentice Corp., Worcester, Mass.

Die Hard Carbide Inserts
McKenna Metals Co., Latrobe, Pa.

Die Sinking Machines
Cincinnati (Ohio) Milling Mch. Co., The.
Pratt & Whitney Div., Niles-Bement-Pond Co., West Hartford, Conn.

Die Typing
Die-Typing Corporation, Detroit, Mich.

Dies—Cast Tool Steel
Advance Foundry Co., The, Dayton, Ohio.

PRODUCTS INDEX

Dies—Pipe Threading

Greenfield (Mass.) Tap & Die Corp.
Landis Mch., Co., Waynesboro, Pa.
Murchey Machine & Tool Co., Detroit,
Mich.
National Acme Co., The, Cleveland.

Dies—Resistance Welding

Mallory, P. R., & Co., Inc., Indianapolis, Ind.

Dies—Sheet Metal Working

Budd, Edward G., Mfg. Co., Philadelphia, Pa.
Niagara Machine & Tool Works, Buffalo, New York.
Sheffield Corp., The, Gage Div., Dayton, Ohio.
South Bend (Ind.) Tool & Die Co., 2406 So. Main St.
Taft-Pierce Mfg. Co., The, Woonsocket, R. I.
Worcester (Mass.) Stamped Metal Co., 6 Hunt St.

Dies—Steel Marking

Cunningham, M. E., Co., Pittsburgh, Pa.
Noble & Westbrook Mfg. Co., The, E. Hartford, Conn.

Dies—Threading

Eastern Mach. Screw Corp., New Haven, Ct.
Greenfield (Mass.) Tap & Die Corp.
Jones & Lamson Mch. Co., Springfield, Vt.
Landis Mch. Co., Waynesboro, Pa.
Murchey Machine & Tool Co., Detroit, Mich.
National Acme Co., The, Cleveland.

Dies—Threading, Opening

Eastern Mach. Screw Corp., New Haven, Ct.
Jones & Lamson Mch. Co., Springfield, Vt.
Landis Mch. Co., Waynesboro, Pa.
Murchey Machine & Tool Co., Detroit, Mich.
National Acme Co., The, Cleveland, Ohio.

Dies—Wire Drawing

Carboly Co., Inc., 11153 E. 8-Mile Road, Detroit, Michigan.
Vascoley-Ramet Corp., North Chicago, Ill.

Doors & Shutters—Steel

Kinnear Mfg. Co., The, Columbus, Ohio
Mahon, R. C., Co., Detroit, Mich.

Drafting Room Furniture

Pease, C. F., Company, The, 2695 W. Irving Pk. Road, Chicago, Ill.

Dressers—Grinding Wheel

Carboly Co., Inc., 11153 E. 8-Mile Rd., Detroit, Mich.

Drilling Machines—Bench

Leland-Gifford Co., Worcester, Mass.

Drilling Machines—Continuous

Davis & Thompson Co., Milwaukee, Wis.

Drilling Machines—Multiple Spindle

Baush Machine Tool Co., Springfield, Mass.
Cincinnati (Ohio) Bickford Tool Co., The.
Henry & Wright Mfg. Co., The, Hartford, Conn.

Drilling Machines—Portable Electric

Black & Decker Mfg. Co., The, Towson, Md.
Rotor Tool Co., The, Cleveland, Ohio.

Drilling Machines—Portable Pneumatic

Heilwig Mfg. Co., St. Paul, Minn.
Rotor Tool Co., The, Cleveland, Ohio.
Warner & Swasey Co., The, Cleveland.

Drilling Machines—Radial

Bryant Machinery & Engineering Co., Chicago.
Cincinnati (Ohio) Bickford Tool Co., The.
Cleveland (Ohio) Punch & Shear Works, Co., The.
Fosdick Machine Tool Co., The, Cincinnati, Ohio.

Drilling Machines—Sensitive

Buffalo (N. Y.) Forge Co., 492 Broadway.
Fosdick Machine Tool Co., The, Cincinnati, Ohio.
Leland-Gifford Co., Worcester, Mass.

Drilling Machines—Vertical

Bryant Machinery & Engineering Co., Chicago.
Cincinnati (Ohio) Bickford Tool Co., The.
Cleereman Mch. Tool Co., Green Bay, Wis.
Fosdick Machine Tool Co., The, Cincinnati, Ohio.

Drilling Machines—Wall Radial

Cleveland (Ohio) Punch & Shear Works Co.

Drills—Hand & Breast

North Bros. Mfg. Co., Philadelphia, Pa.

Drives—Multiple V-Belt

Allis-Chalmers Mfg. Co., Milwaukee.
Medart Co., The, St. Louis, Mo.
Multiple V-Belt Drive Assn., Chicago, Ill.

Dust Collectors

Abrasiv Machine Tool Co., East Providence, R. I.
American Blower Corp., 6000 Russell St., Detroit, Mich.
American Foundry Equipment Co., The, 510 S. Brykit St., Mishawaka, Ind.
Kirk & Blum Mfg. Co., The, Cincinnati, Ohio.
Mahon, R. C., Co., Detroit, Mich.
Pangborn Corporation, Hagerstown, Md.
Ruemelin Mfg. Co., 3870 N. Palmer St., Milwaukee, Wisconsin.
Whiting Corp., Harvey, Ill.

Economizers

Babcock & Wilcox Co., The, 85 Liberty St., N. Y. C.

Electrical Equipment

Allis-Chalmers Mfg. Co., Milwaukee.
Electric Controller & Mfg. Co., The, Cleveland, Ohio.
Fairbanks, Morse & Co., Chicago, Ill.
General Electric Co., Schenectady, N. Y.
Westinghouse Elec. & Mfg. Co., E. Pittsburgh, Pa.

Electrodes—Welding

Arco Corp., Philadelphia, Pa.
Harmschfeiger Corp., 4401 W. National Ave., Milwaukee.
Lincoln Electric Co., The, Cleveland.
Mallory, P. R., & Co., Inc., Indianapolis, Ind.
Maurath, Inc., 7400 Union Ave., Cleveland.
Una Welding, Inc., Cleveland, Ohio.

Electroplating

Woodworth, N. A., Co., Detroit, Mich.

Electroplating Equipment & Supplies

Stefen, J. J., Co., Detroit, Mich.
Udylite Corp., The, Detroit, Mich.
United Chromium Incorporated, 51 East 42nd St., N. Y. C.

Engineers & Contractors

Brassert, H. A., & Co., Pittsburgh.
Koppers Co., Engineering & Construction Div., Pittsburgh, Pa.
McKee, Arthur G., & Co., Cleveland, Ohio.
Rowe, Arthur E., Cleveland, Ohio.

Engines—Gas, Oil

Fairbanks, Morse & Co., Chicago, Ill.

Facing Machines—Precision

Ex-Cell-O Corp., 1210 Oakman Blvd., Detroit, Mich.

Factory & Plant Sites

Zoll, Edward H., 207 Market St., Newark, N. J.

Fans—Ventilating

American Blower Corp., 6000 Russell St., Detroit, Mich.
Buffalo (N. Y.) Forge Co., 492 Broadway.

Felt—Wool Mechanical

American Felt Co., Glenville, Conn.

Fence—Chain Link

American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Cleveland.
Atlas Fence Co., Philadelphia, Pa.
Buffalo (N. Y.) Wire Works Co., Inc.
Page Steel & Wire Div., American Chain & Cable Co., Inc., Monessen, Pa.
Pittsburgh (Pa.) Steel Co.
Wickwire Spencer Steel Co., 500 Fifth Ave., N. Y. C.

Fencing—Wire

Jones & Laughlin Steel Corp., Pittsburgh.

Ferroalloys

Climax Molybdenum Co., 500 Fifth Ave., N. Y. C.
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.
Ohio Ferro-Alloys Corp., Canton, Ohio.
Samuel, Frank, & Co., Inc., Philadelphia.

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Bethlehem (Pa.) Steel Company.
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.
Jones & Laughlin Steel Corp., Pittsburgh.
Ohio Ferro-Alloys Corp., Canton, Ohio.
Samuel, Frank, & Co., Inc., Philadelphia.

Ferromolybdenum

Climax Molybdenum Co., 500 Fifth Ave., N. Y. C.

Ferrosilico Manganese

Ohio Ferro-Alloys Corp., Canton, Ohio.

Ferrosilicon

Cleveland-Cliffs Iron Co., The, Cleveland, Ohio.
Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.
Ohio Ferro-Alloys Corp., Canton, Ohio.
Samuel, Frank, & Co., Inc., Philadelphia.

Ferrotitanium

Titanium Alloy Mfg. Co., The, Niagara Falls, New York.

Ferrovanadium

Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

Files & Rasps

Atkins, E. C., & Co., 406 So. Illinois St., Indianapolis, Ind.
Bissell, Henry, & Sons, Inc., Philadelphia, Pa.
Nicholson File Co., Providence, R. I.

Filing Machines

Continental Machines, Inc., 1311 S. Washington Ave., Minneapolis, Minn.

Filter Cloth—Asbestos

Johns-Manville Corp., 22 East 40th St., New York City.

Filters—Air

Whiting Corp., Harvey, Ill.

Filters—Oil

National Acme Co., The, Cleveland.

Flanges—Forged Steel

Harrisburg (Pa.) Steel Corp.
Standard Steel Wks. Div., The Baldwin Locomotive Works, Phila., Pa.

Flanges—Welded Steel

King Fifth Wheel Co., 2915 N. Second St., Philadelphia.

Flexible Shaft Equipment

Lovejoy Flexible Coupling Co., 4979 Lake St., Chicago, Ill.
Strand, N. A., & Co., Chicago.

Flooring—Acid Proof

Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

Flooring—Monolithic

Carey Philip Co., The, Cincinnati, O.
Johns-Manville Corp., 22 East 40th St., New York City.

Flooring—Steel

Alan Wool Steel Co., Conshohocken, Pa.
Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Inland Steel Co., Chicago.

Flux—Soldering & Welding

Linde Air Products Company, The, 30 E. 42nd St., N. Y. C.
Ruby Chemical Co., Columbus, Ohio.

Forging Machines

Ajax Mfg. Co., The, Cleveland, Ohio.

Forging Machines—Roll

Ajax Mfg. Co., The, Cleveland, Ohio.

Forgings—Brass, Bronze or Copper

American Brass Co., The, Waterbury, Conn.
Cramp Brass & Iron Foundries Div. of The Baldwin Locomotive Wks., Philadelphia.
Harvey Metal Corp., The, Chicago, Ill.
Revere Copper & Brass, Inc., 230 Park Ave., New York City.
Titan Metal Mfg. Co., Bellefonte, Pa.
Transue & Williams Steel Forging Corp., Alliance, Ohio.

Forgings—Drop

Atlas Drop Forge Co., Lansing, Mich.
Canton (Ohio) Drop Forging & Mfg. Co.
Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Champion Machine & Forging Co., The, Cleveland, Ohio.
Herbrard Corp., The, Fremont, Ohio.
Rockford (Ill.) Drop Forge Co.
Transue & Williams Steel Forging Corp., Alliance, Ohio.
Wilcox, D., Mfg. Co., Mechanicsburg, Pa.
Williams, J. H., & Co., Buffalo, N. Y.

Forgings—Hollow Bored

American Hollow Boring Co., 1912 Raspberry St., Erie, Pa.
Harrisburg (Pa.) Steel Corp.
Midvale Co., The, Nicetown, Phila., Pa.
National Forge & Ordnance Co., Irvine, Pa.

Forgings—Iron & Steel

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Atlas Drop Forge Co., Lansing, Mich.
Bay City Forge Co., Erie, Pa.
Bethlehem (Pa.) Steel Company.
Heppenstall Co., Pittsburgh.
Mesta Mch. Co., Pittsburgh.
Midvale Co., The, Nicetown, Phila., Pa.
National Forge & Ordnance Co., Irvine, Pa.
Standard Steel Wks. Div., The Baldwin Locomotive Works, Phila., Pa.
Taylor-Wharton Iron & Steel Co., High Bridge, N. J.

Forgings—Magnesium Alloys

American Magnesium Corp., 1701 Gulf Bldg., Pittsburgh.
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

Forgings—Upset

Bethlehem (Pa.) Steel Company.
Lamson & Sessions Co., The, Cleveland.
Rockford (Ill.) Drop Forge Co.
Standard Tube Co., The, Detroit, Mich.

Form Tools

Hardinge Brothers, Inc., Elmira, New York.

Foundry Equipment & Supplies

Whiting Corp., Harvey, Ill.

Frogs & Switches—Railway

Taylor-Wharton Iron & Steel Co., High Bridge, N. J.

Furnace Atmosphere Controls

Wilson Lee Sales Corp., Cleveland, Ohio.

Furnaces—Billet or Ingot Heating

Amsler-Morton Co., The, Pittsburgh, Pa.
Salem (Ohio) Engineering Co.
Surface Combustion Corp., 2375 Dorr St., Toledo, Ohio.
Wean Engineering Co., Inc., Warren, Ohio.
Wilson Lee Sales Corp., Cleveland, Ohio.

Furnaces—Electric, Steel Melting

American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Detroit Electric Furnace Div., Kuhlman Electric Co., Bay City, Mich.
Pittsburgh (Pa.) Lectromelt Furnace Corp.

Furnaces—Forging

Drever Co., The, Philadelphia, Pa.
Holcroft & Co., Detroit.
Salem (Ohio) Engineering Co.
Stewart Furnace Div., Chicago Flexible Shaft Co., Chicago.
Surface Combustion Corp., 2375 Dorr St., Toledo, Ohio.
Wean Engineering Co., Inc., Warren, Ohio.
Wilson Lee Sales Corp., Cleveland, Ohio.

Furnaces—Galvanizing

General Electric Co., Schenectady, N. Y.
Holden, A. F., Co., The, New Haven, Conn.
Salem (Ohio) Engineering Co.
Stewart Furnace Div., Chicago, Flexible Shaft Co., Chicago.
Surface Combustion Corp., 2375 Dorr St., Toledo, Ohio.
Vaughn Machinery Co., The, Cuyahoga Falls, Ohio.
Wilson Lee Sales Corp., Cleveland, Ohio.
R-S Products Corp., Philadelphia, Pa.

Furnaces—Heat Treating, Electric

General Electric Co., Schenectady, N. Y.
Holden, A. F., Co., The, New Haven, Conn.
Holden, A. F., Co., The, New Haven, Conn.
Hoskins Mfg. Co., Detroit, Mich.
Leeds & Northrup Co., 4956 Stenton Ave., Philadelphia.
Lindberg Engineering Co., 228 North Laflin St., Chicago, Ill.
R-S Products Corp., Philadelphia, Pa.

Rockwell, W. S., Co., 50 Church St., N. Y. C.
Salem (Ohio) Engineering Co.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Furnaces—Heat Treating, Oil or Gas

Drever Co., The, Philadelphia, Pa.
Holcroft & Co., Detroit.
Holden, A. F., Co., The, New Haven, Conn.

Lindberg Engineering Co., 228 North Laflin St., Chicago, Ill.

Lithium Corp., The, Newark, New Jersey.

Pennsylvania Industrial Engineers, Pittsburgh.

R-S Products Corp., Philadelphia, Pa.

Salem (Ohio) Engineering Co.

Stewart Furnace Div., Chicago Flexible Shaft Co., Chicago.

Surface Combustion Corp., 2375 Dorr St., Toledo, Ohio.

Wean Engineering Co., Inc., Warren, Ohio.

Wilson Lee Sales Corp., Cleveland, Ohio.

Gas—Boosters & Exhausters

Roots-Connerville Blower Corp., Connerville, Ind.

Gaskets—Asbestos, Metal or Rubber

Garlock Packing Co., The, Palmyra, N. Y.

Johns-Manville Corp., 22 East 40th St., New York City.

Gates—Motor-Operated

Atlas Fence Co., Philadelphia, Pa.

Gear Checking Equipment

Michigan Tool Co., Detroit, Mich.

National Broach & Machine Co., Detroit, Mich.

Gear Cutting Machines

Farrel-Birmingham Co., Inc., Buffalo, N. Y.

Gleason Works, Rochester, N. Y.

Gear Drives—Herringbone

Continental Roll & Steel Foundry Co., East Chicago, Ind.

Farrel-Birmingham Co., Inc., Buffalo, New York.

Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh.

Mesta Machine Co., Pittsburgh, Pa.

United Engineering & Fdry. Co., Ptgh.

Gear Lapping Machines

Michigan Tool Co., Detroit, Mich.

National Broach & Machine Co., Detroit, Mich.

Gearmotors

Allis-Chalmers Mfg. Co., Milwaukee, N. Y.

General Electric Co., Schenectady, N. Y.

Reliance Electric & Engineering Co., Cleveland, Ohio.

Westinghouse Elec. & Mfg. Co., East Ptgh.

Gear Planing Machines

Gleason Works, Rochester, N. Y.

Gear Shaving Machines

Michigan Tool Co., Detroit, Mich.

National Broach & Machine Co., Detroit, Mich.

Gear Tooth Burring Machines

Cross Gear & Machine Co., Detroit, Mich.

Gears—Cut

Bush Machine Tool Co., Springfield, Mass.

Cone-Drive Div., Michigan Tool Co., Detroit, Mich.

Earle Gear & Machine Co., Phila., N. Y.

Farrel-Birmingham Co., Inc., Buffalo, N. Y.

General Gear Co., Detroit, Mich.

Gleason Works, Rochester, N. Y.

Hartford (Conn.) Special Machinery Co., The.

Mesta Machine Co., Pittsburgh.

National-Erie Corp., Erie, Pa.

Philadelphia (Pa.) Gear Works.

Simonds Gear & Mfg. Co., Pittsburgh.

Taylor-Wilson Mfg. Co., 25 Thomson St., McKees Rocks, Pa.

Gears—Ground Teeth

Hartford (Conn.) Special Machinery Co., The.

Gears—Machine Molded

Poole Foundry & Mch. Co., Baltimore, Md.

Gears—Non-Metallic

Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.

Philadelphia (Pa.) Gear Works.

Generator Sets—Gas & Diesel Engine Plants

Ready-Power Co., The, Detroit, Mich.

Generators—Acetylene

Air Reduction, 60 East 42nd St., N. Y. C.

Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

Generators—Electric

Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Fairbanks, Morse & Co., Chicago, Ill.

General Electric Co., Schenectady, N. Y.

Hobart Bros. Co., Troy, Ohio.

Reliance Electric & Engineering Co., Cleveland, Ohio.

Westinghouse Elec. & Mfg. Co., East Ptgh.

Gloves—Asbestos & Fireproof

American Optical Co., Southbridge, Mass.

Industrial Gloves Co., Danville, Ill.

PRODUCTS INDEX

Goggles—Safety

American Optical Co., Southbridge, Mass.

Graduating Machines—Metal

Noble & Westbrook Mfg. Co., The, E. Hartford, Conn.

Grating

Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa. Borden Metal Products Co., Elizabeth, New Jersey. Hendrick Mfg. Co., Carbondale, Pa. Kerlow Steel Flooring Co., Jersey City, N. J.

Grease—See Lubricants

Grilles—Perforated Metal

Diamond Mfg. Co., Wyoming, Pa. Erdle Perforating Co., Rochester, N. Y. Harrington & King Perforating Co., The Chicago. Mundt, Chas. & Sons, 59 Fairmount Ave., Jersey City, N. J.

Grinders—Carbide Tool

Ex-Cell-O Corp., 1210 Oakman Blvd., Detroit, Mich.

Grinders—Cold Saw Sharpening

Atkins, E. C. & Co., 406 So. Illinois St., Indianapolis, Ind. Motch & Merryweather Machinery Co., The, Cleveland, Ohio.

Grinders—For Lathe & Planer Tools

Gisholt Machine Co., Madison, Wis. Sellers, William, & Co., Inc., 1629 Hamilton St., Phila., Pa. Sundstrand Machine Tool Co., Rockford, Ill.

Grinding Fixtures—Drill

Industrial Engineering Co., Inc., Minneapolis, Minn.

Grinding and Polishing Machines

Black & Decker Mfg. Co., The, Towson, Md. Bryant Machinery & Engineering Co., Chicago. Excelsior Tool & Mfg. Co., E. St. Louis, Ill. Norton Co., Worcester, Mass. Vonnegut Moulder Corp., Indianapolis, Ind.

Grinding Machines—Centerless

Cincinnati (Ohio) Grinders Incorporated.

Grinding Machines—Chucking

Bryant Chucking Grinder Co., Springfield, Vt.

Grinding Machines—Cylinder

Heald Machine Co., Worcester, Mass.

Grinding Machines—Cylindrical

Brown & Sharpe Mfg. Co., Providence, R. I. Cincinnati (Ohio) Grinders Incorporated. Landis Tool Co., Waynesboro, Pa. Norton Co., Worcester, Mass.

Grinding Machines—Drill

Gallmeyer & Livingston Co., Grand Rapids, Mich. Sellers, William, & Co., Inc., 1629 Hamilton St., Philadelphia, Pa.

Grinding Machines—Face

Abrasives Machine Tool Co., East Providence, R. I.

Grinding Machines—Flexible Shaft

Pratt & Whitney Div. Niles-Bement-Pond Co., West Hartford, Conn. Strand, N. A., & Co., Chicago.

Grinding Machines—Gear & Worm

Pratt & Whitney Div. Niles-Bement-Pond Co., West Hartford, Conn.

Grinding Machines—Internal

Bryant Chucking Grinder Co., Springfield, Vt. Heald Machine Co., Worcester, Mass.

Grinding Machines—Internal Multiple Spindle

Baird Mfg. Co., The, Bridgeport, Conn.

Grinding Machines—Knife & Shear Blade

Harris-Seybold-Potter Co., Dayton, Ohio.

Grinding Machines—Portable Electric

Black & Decker Mfg. Co., The, Towson, Md. Chicago (Ill.) Wheel & Mfg. Co., 1101 W. Monroe St. Rotor Tool Co., The, Cleveland, Ohio.

Grinding Machines—Portable Pneumatic

Rotor Tool Co., The, Cleveland, Ohio.

Grinding Machines—Roll

Cincinnati (Ohio) Grinders Incorporated. Farrel-Birmingham Co., Inc., Ansonia, Conn. Landis Tool Co., Waynesboro, Pa.

Grinding Machines—Surface

Abrasives Machine Tool Co., E. Prov., R. I. Blanchard Machine Co., Cambridge, Mass. Gallmeyer & Livingston Co., Grand Rapids, Mich. Heald Machine Co., Worcester, Mass. Norton Co., Worcester, Mass. Pratt & Whitney Div. Niles-Bement-Pond Co., West Hartford, Conn.

Grinding Machines—Swing Frame

Black & Decker Mfg. Co., The, Towson, Md. Shuster, F. B., Co., The, New Haven. Vonnegut Moulder Corp., Indianapolis, Ind.

Grinding Machines—Top

Gallmeyer & Livingston Co., Grand Rapids, Mich. Jones & Lamson Machine Co., Springfield, Vt.

Grinding Machines—Thread

Ex-Cell-O Corp., 1210 Oakman Blvd., Detroit, Mich. Jones & Lamson Machine Co., Springfield, Vt.

Grinding Machines—Universal Cutter

Cincinnati (Ohio) Milling Mch. Co., The. Continental Machines, Inc., 1311 S. Washington Ave., Minneapolis, Minn. Gallmeyer & Livingston Co., Grand Rapids, Mich. General Machinery Corp., Boston, Mass. Landis Tool Co., Waynesboro, Pa. LeBlond, R. K., Machine Tool Co., Cincinnati. Norton Co., Worcester, Mass.

Grinding Wheels

Abrasives Co., Philadelphia, Pa. Bay State Abrasive Products Co., Westboro, Mass. Blanchard Machine Co., Cambridge, Mass. Carborundum Co., The, Niagara Falls, N. Y. Chicago (Ill.) Wheel & Mfg. Co., 1101 W. Monroe St. Macklin Company, Jackson, Mich. Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Towsend St., Passaic, N. J. Norton Co., Worcester, Mass.

Grinding Wheels—Mounted, Pencil

Bay State Abrasive Products Co., Westboro, Mass. Chicago (Ill.) Wheel & Mfg. Co., 1101 W. Monroe St.

Grinding Wheels—Segment

Abrasives Co., Philadelphia, Pa. Blanchard Machine Co., Cambridge, Mass.

Guards—Power Press

Junkin Safety Appliance Co., Inc., Louisville, Ky.

Hammers—Air, Forging

Chambersburg (Pa.) Engineering Co. Lake Erie Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y. Lohdell Car Wheel Co., Nazel Hammer Div., Wilmington, Del.

Hammers—Chipping & Riveting

Black & Decker Mfg. Co., The, Towson, Md.

Hammers—Drop

Ajax Mfg. Co., The, Cleveland. Chambersburg (Pa.) Engineering Co. Erie (Pa.) Foundry Co. Morgan Engineering Co., The, Alliance, O.

Hammers—Helve

Bradley, C. C., & Son, Inc., Syracuse, N. Y.

Hammers—Machinists*

Ushio Mfg. Co., Inc., 135 Tonawanda St., Buffalo, N. Y.

Hammers—Steam

Chambersburg (Pa.) Engineering Co. Erie (Pa.) Foundry Co. Morgan Engineering Co., The, Alliance, O.

Hangers—Shaft

Dodge Mfg. Corp., Mishawaka, Ind. Fafnir Bearing Co., The, New Britain, Conn.

Hyatt Bearings Div. General Motors Sales Corp., Harrison, N. J. S. K. F. Industries, Inc., Front St. & Erie Ave., Phila., Pa.

Triangle Mfg. Co., Oshkosh, Wis.

Hardening Machines—Electric Induction

Ohio Crankshaft Co., The, Cleveland, Ohio.

Heading Machines

Ajax Mfg. Co., The, Cleveland, Ohio. Waterbury (Conn.) Farrel Foundry & Machine Co., The.

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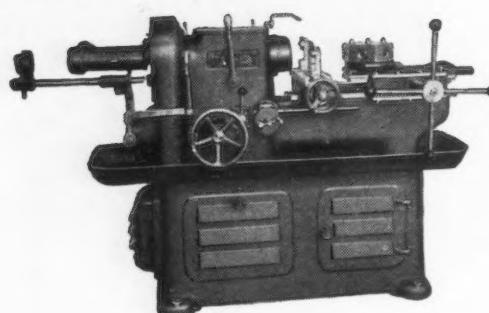
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Heads—Spun and Pressed

Worth Steel Co., Claymont, Del.

Heat Exchangers

Harrison Radiator Div. General Motors Corp., Lockport, N. Y.

Heat Treating

Agerstrand Corp., Muskegon, Mich.
Barnes-Gibson-Raymond, Detroit, Plant Div. of Associated Spring Corp.
Barnes, Wallace Co., Div. of Associated Spring Corp., Bristol, Conn.
Flame Treating & Engineering Co., The Hartford, Conn.
General Machine Wks., York, Pa.
Holden, A. F., Co., The, New Haven, Conn.
Parish Pressed Steel Co., Reading, Pa.
Pennsylvania Industrial Engineers, Pittsburgh.
Woodworth, N. A., Co., Detroit, Mich.

Heat Treating Compounds

Heatbath Corp., Springfield, Mass.
Houghton, E. F., & Co., Philadelphia, Pa.
Mitchell-Bradford Chemical Co., The, Bridgeport, Conn.

Heaters—Unit

American Foundry Equipment Co., The, 510 S. Byrkt St., Mishawaka, Ind.

Hoists

Brown & Sharpe Mfg. Co., Providence, R. I.

Hoists—Air

Curtis Pneumatic Mfry. Co., 1948 Klenlein Ave., St. Louis, Mo.
Detroit (Mich.) Hoist & Mach. Co.
Northern Engineering Works, Detroit.

Hoists—Chain

Ford Chain Block Div. American Chain & Cable Co., Inc., Philadelphia, Pa.
Reading (Pa.) Chain & Block Corp.
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

Hoists—Electric

American Engineering Co., Philadelphia.
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., 1115 East 283rd St., Wickliffe, Ohio.
Detroit (Mich.) Hoist & Mach. Co.
ElectroLift, Inc., Hudson Terminal Bldg., 46 Church St., New York City.
Euclid Crane & Hoist Co., The, Euclid, O.
Harnischfeger Corp., 4401 W. National Ave., Milwaukee, Wis.
Northern Engineering Works, Detroit, Mich.
Philadelphia (Pa.) Gear Works,
Reading (Pa.) Chain & Block Corp.
Robbins & Myers, Inc., Springfield, Ohio.

Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.

Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.
Yale & Towne Mfg. Co., The, Phila. Div., Phila., Pa.

Hoists—Electric, Gasoline & Diesel

Silent Hoist Winch & Crane Co., 851-63rd St., Brooklyn, N. Y.

Hoists—Monorail

American Engineering Co., Philadelphia.
American Monorail Co., The, Cleveland.
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., 1115 East 283rd St., Wickliffe, Ohio.
ElectroLift, Inc., Hudson Terminal Bldg., 46 Church St., New York City.
Euclid Crane & Hoist Co., The, Euclid, O.

Northern Engineering Works, Detroit.
Robbins & Myers, Inc., Springfield, Ohio.

Shaw-Box Crane & Hoist Div. Manning, Maxwell & Moore, Inc., 402 Broadway, Muskegon, Mich.

Shepard Niles Crane & Hoist Corp., Montour Falls, N. Y.

Honing Machines

Micromatic Hone Corp., Detroit, Mich.

Hose—Flexible Metallic

American Brass Co., The, Waterbury, Conn.

Hose—Rubber

Hewitt Rubber Corp., Buffalo, N. Y.
Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, Townsend St., Passaic, N. J.

Hydraulic Machinery

Baldwin-Southwark Div. Baldwin Locomotive Wks., Philadelphia.
Birdsboro (Pa.) Steel Foundry & Machine Co.
Continental Roll & Steel Foundry Co., East Chicago, Ind.

Denison Engineering Co., The, 108 W. Chestnut St., Columbus, Ohio.

Faruquier, A. B., Co., Ltd., York, Pa.

Hannifin Mfg. Co., Chicago, Ill.

Lake Erie Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y.

Morgan Engineering Co., The, Alliance, O.

Oilgear Co., The, 1311 W. Bruce St., Milwaukee, Wis.

Watson-Stillman Co., The, 103 Aldene Road, Roselle, N. J.

Wood, R. D., & Co., Philadelphia, Pa.

Hydraulic Power Units

American Engineering Co., Philadelphia.

Ex-Cell-O Corp., 1210 Oakman Blvd., Detroit, Mich.

Officer Co., The, 1311 W. Bruce St., Milwaukee, Wis.

Sundstrand Machine Tool Co., Rockford, Ill.

Twin Disc Clutch Co., Racine, Wis.

Ingot Mold—Plugs

National Carbon Co., Inc., Carbon Sales Div., Cleveland, Ohio.

Ingot Molds

Shenango-Penn Mold Co., Dover, Ohio.
Valley Mould & Iron Corp., Hubbard, Ohio.

Ingots—Aluminum

Aluminum Co. of America, Pittsburgh.

Ingots—Phosphor Bronze

Phosphor Bronze Smelting Co., The, Philadelphia, Pa.

Inhibitors

American Chemical Paint Co., Ambler, Pa.

Instruments—Electric, Indicating & Recording

Brown Instrument Co., The, Philadelphia, Pa.

General Electric Co., Schenectady, N. Y.

Leeds & Northrup Co., 4956 Stenton Ave., Philadelphia.

Instruments—Surface Analyzer

Physicists Research Co., Ann Arbor, Mich.

Insulation

Illinois Clay Products Co., Joliet, Ill.
Johns-Manville Corp., 22 East 40th St., New York City.

Keys—Riveted

Western Wire Prods. Co., St. Louis, Mo.

Keyseating Machines

Davis Keyseater Co., 400 Exchange St., Rochester, N. Y.

Lacquer, Varnish, Etc.

Hilo Varnish Corp., 42-60 Stewart Ave., Brooklyn, N. Y.

Lamps—Industrial

General Electric Co., Lamp Dept., Nela Park, Cleveland.

Westinghouse Electric & Mfg. Co., Lighting Div., Cleveland, Ohio.

Lapping Compounds

Clover Mfg. Co., Norwalk, Conn.

Lapping Machines

Cincinnati (Ohio) Grinders Incorporated.

Ex-Cell-O Corp., 1210 Oakman Blvd., Detroit.

Ultra-Lap Machine Co., Detroit, Mich.

Lapping Service

Ultra-Lap Machine Co., Detroit, Mich.

Lathe Attachments

Hendey Machine Co., Torrington, Conn.

South Bend (Ind.) Lathe Works, 587 East Madison St.

Sundstrand Machine Tool Co., Rockford, Ill.

Lathe—Automatic

Baird Mch. Co., The, Bridgeport, Conn.

Bullard Co., The, Bridgeport, Conn.

Cross Gear & Machine Co., Detrit, Mich.

Gisholt Machine Co., Madison, Wis.

Goss & De Leeuw Mch. Co., New Britain, Conn.

Jones & Lamson Mch. Co., Springfield, Vt.

LeBlond, R. K., Mch. Tool Co., Cincinnati.

Monarch Mch. Tool Co., The, Sidney, O.

Potter & Johnston Machine Co., Pawtucket, R. I.

Sundstrand Machine Tool Co., Rockford, Ill.

Lathe—Automatic Turret

Potter & Johnston Machine Co., Pawtucket, R. I.

PRODUCTS INDEX

Lathes—Automatic Vertical

Baird Mch. Co., The, Bridgeport, Conn.
Bullard Co., The, Bridgeport, Conn.

Lathes—Bench

Hardinge Brothers, Inc., Elmira, New York.
Pratt & Whitney Div., Niles-Bement-Pond Co., West Hartford, Conn.
South Bend (Ind.) Lathe Works, 587 East Madison St.

Lathes—Crankshaft

LeBlond, R. K., Mch. Tool Co., Cincinnati.
Potter & Johnston Machine Co., Pawtucket, R. I.
Sundstrand Machine Tool Co., Rockford, Ill.

Lathes—Engine & Toolroom

Axelson Mfg. Co., Los Angeles, Calif.
Bryant Machinery & Engineering Co., Chicago.
Cincinnati (Ohio) Lathe & Tool Co.
Hendey Machine Co., Torrington, Conn.
Hill-Clarke Mchry. Co., 647 W. Washington Blvd., Chicago.
LeBlond, R. K., Mch. Tool Co., Cincinnati.
Monarch Mch. Tool Co., The, Sidney, O.
Pratt & Whitney Div., Niles-Bement-Pond Co., West Hartford, Conn.
Reed-Prentice Corp., Worcester, Mass.
South Bend (Ind.) Lathe Works, 587 East Madison St.

Lathes—Roll

Continental Roll & Steel Foundry Co., East Chicago, Ind.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh.
Mesta Mch. Co., Pittsburgh.
United Engineering & Fdry. Co., Ptgh.

Lathes—Turret

Acme Machine Tool Co., The, Cincinnati, Ohio.
Bardons & Oliver, Inc., Cleveland.
Bullard Co., The, Bridgeport, Conn.
Gisholt Machine Co., Madison, Wis.
Jones & Lamson Mch. Co., Springfield, Vt.
Morey Machinery Co., Inc., 410 Broome St., New York City.
Potter & Johnston Mch. Co., Pawtucket, R. I.
Simmons Machine Tool Corp., Albany, N. Y.
South Bend (Ind.) Lathe Works, 587 East Madison St.
Warner & Swasey Co., The, Cleveland.

Lathes—Turret, Vertical

Bullard Co., The, Bridgeport, Conn.
Ganey Machinery Co., Buffalo, New York.

Lead—Tellurium

National Lead Co., 111 Bdway., N. Y. C.

Leggings—Safety

American Optical Co., Southbridge, Mass.

Leveling Machines

Aetna-Standard Engineering Co., The, Youngstown, Ohio.
McKay Machine Co., The, Youngstown, Ohio.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Wean Engineering Co., Inc., The, Warren, O.

Lighting—Industrial

Fleur-O-Lier Manufacturers, Cleveland, Ohio.
General Electric Co., Lamp Dept., Nela Park, Cleveland, Ohio.
Westinghouse Electric & Mfg. Co., Lighting Div., Cleveland, Ohio.

Lining—Converter

Edge Hill Silica Rock Co., Fort Washington, Pa.

Lockers—Clothing

All-Steel-Equip Co., Inc., 702 John St., Aurora, Ill.

Locomotives—Diesel

Atlas Car & Mfg. Co., The, Cleveland, Ohio.
Porter, H. K., Co., Inc., Pittsburgh, Pa.

Locomotives—Fireless

Porter, H. K., Co., Inc., Pittsburgh, Pa.

Locomotives—Gasoline

Plymouth (Ohio) Locomotive Works Div., Fate-Root-Heath Co.

Locomotives—Steam

Iron & Steel Products, Inc., Chicago.
Porter, H. K., Co., Inc., Pittsburgh, Pa.

Lubricants—Industrial

Cities Service Oil Co., 60 Wall Tower, New York City.
Gulf Oil Corp., Gulf Refining Co., Pittsburgh.
Houghton, E. F., & Co., Philadelphia, Pa.
Penola, Inc., Pittsburgh, Pa.

Shell's Industrial Lubricants Div., Shell Bldg., San Francisco, Shell Bldg., St. Louis, & 50 W. 50th St., N. Y. C.
Socony-Vacuum Oil Co., Inc., 26 Broadway, New York City.
Standard Oil Co. (Indiana), Chicago.
Stuart, D. A., Oil Co., Ltd., Chicago, Ill.
Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd St., N. Y. C.
Tide Water Associated Oil Co., 17 Battery Place, N. Y. C.

Lubricating Systems

Alemite Div., Stewart-Warner Corp., Chicago, Ill.

Machine Work

Fidelity Machine Co., Philadelphia, Pa.
General Machine Works, York, Pa.
Taft-Peirce Mfg. Co., The, Woonsocket, R. I.
Union Brass & Metal Mfg. Co., St. Paul, Minn.
Wakefield Manufacturing Co., Shelbyville, Tenn.

Machinists' Small Tools

Brown & Sharpe Mfg. Co., Providence, R. I.

Magnesium

American Magnesium Corp., 1701 Gulf Bldg., Pittsburgh.
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

Magnets—Lifting

Cutler-Hammer, Inc., Milwaukee.
Dings Magnetic Separator Co., 517, East Smith St., Milwaukee.
Electric Controller & Mfg. Co., The, Cleveland.
Ohio Electric Mfg. Co., The, 5908 Maurice Ave., Cleveland.

Magnets—Permanent

Crucible Steel Co. of America, Chrysler Bldg., New York City.
Taylor-Wharton Iron & Steel Co., High Bridge, N. J.

Magnets—Separating—See Separators—Magnetic

Mandrels—Expanding

Nicholson, W. H., & Co., 165 Oregon St., Wilkes-Barre, Pa.

Manganese Metal and Alloys

Electro Metallurgical Sales Corp., 30 East 42nd St., N. Y. C.

Manhole Fittings and Saddles

Worth Steel Co., Claymont, Del.

Marking Machines—For Metal

Noble & Westbrook Mfg. Co., The, E. Hartford, Conn.

Metal Cleaning Compounds

American Chemical Paint Co., Ambler, Pa.
Ford, J. B., Sales Co., The, Wyandotte, Mich.
Holden, A. F., Co., The, New Haven, Conn.
Pennsylvania Salt Mfg. Co., Philadelphia.

Metal Specialties—See Stampings

Meters—Flow

Brown Instrument Co., The, Philadelphia, Pa.
Leeds & Northrup Co., 4956 Stenton Ave., Philadelphia.
Roots-Connerville Blower Corp., Connerville, Ind.

Mica Schist

Edge Hill Silica Rock Co., Fort Washington, Pa.

Micrometers

Davis & Thompson Co., Milwaukee, Wis.

Milling Machines—Automatic

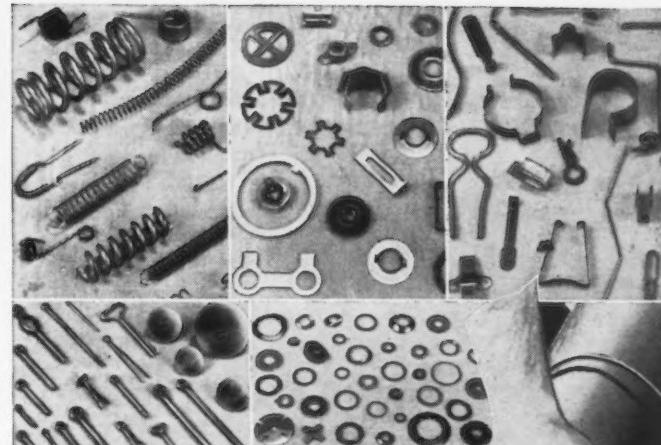
Cincinnati (Ohio) Milling Mch. Co., The.
Jones & Lamson Machine Co., Springfield, Vt.
Kearney & Trecker Corp., Milwaukee, Wis.
Sundstrand Machine Tool Co., Rockford, Ill.

Milling Machines—Bench

Hardinge Brothers, Inc., Elmira, New York.

Milling Machines—Continuous

Davis & Thompson Co., Milwaukee, Wis.
National Broach & Machine Co., Detroit, Mich.
Sundstrand Machine Tool Co., Rockford, Ill.



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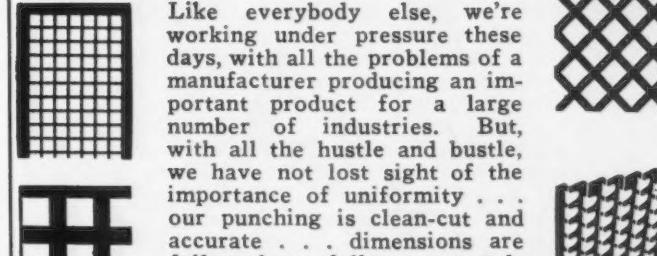
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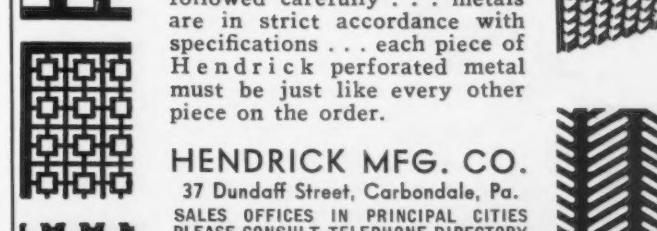
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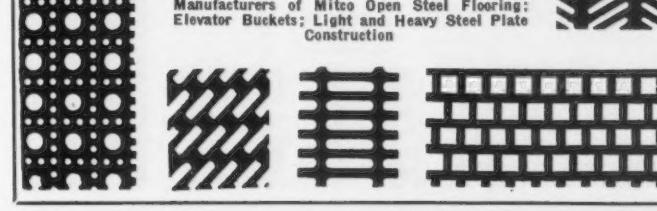
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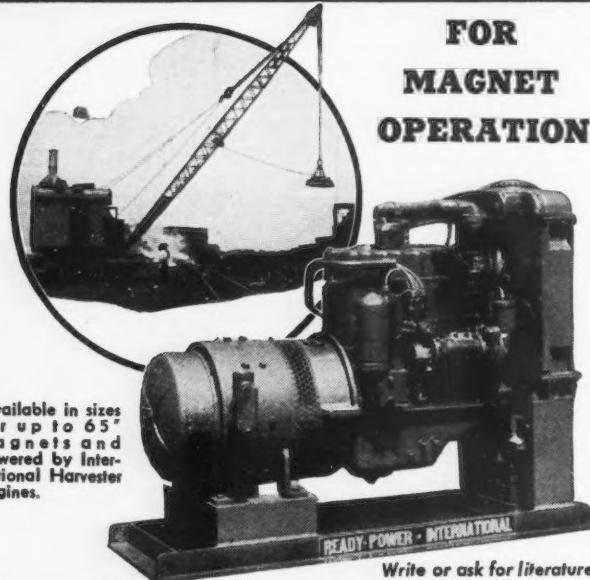
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Simmons Machine Tool Corp., Albany,
N. Y.
Sundstrand Machine Tool Co., Rock-
ford, Ill.

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Hamilton St., Philadelphia, Pa.

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Cross Gear & Machine Co., Detroit,
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Kearney & Trecker Corp., Milwaukee,
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Cincinnati (Ohio) Milling Mch. Co.,
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Wis.
National Broach & Machine Co., Detroit,
Mich.
Reed-Prentice Corp., Worcester, Mass.
Sundstrand Machine Tool Co., Rock-
ford, Ill.

Milling & Profiling Machines

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Molding Machines

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Osborn Mfg. Co., The, Cleveland, Ohio.
Tabor Mfg. Co., Phila., Pa.

Molybdenum

Climax Molybdenum Co., 500 Fifth
Ave., N. Y. C.

Monel Metal

International Nickel Co., Inc., The,
17 Wall St., N. Y. C.

Monorail Systems—Hand & Electric

American Monorail Co., The, Cleveland.
Cleveland Tramrail Div. of The Cleve-
land Crane & Engng. Co., 1115 East
283rd St., Wickliffe, Ohio.

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Corp., Dayton, Ohio.
Fairbanks, Morse & Co., Chicago.
General Electric Co., Schenectady,
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Harnischfeger Corp., 4401 W. National
Ave., Milwaukee.
Howell (Mich.) Electric Motors Co.
Lincoln Electric Co., The, Cleveland.
Reliance Electric & Engineering Co.,
Cleveland, Ohio.
Robbins & Myers, Inc., Springfield,
Ohio.
Westinghouse Elec. & Mfg. Co., E.
Pittsburgh.

Nails—Wire

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Steel Corp. Subsidiary), Cleveland.
Columbia Steel Co. (U. S. Steel Corp.
Subsidiary), San Francisco, Calif.
Wickwire Brothers, Inc., Cortland,
N. Y.
Youngstown (Ohio) Sheet & Tube Co.,
The.

Name Plates

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United States Bronze Sign Co., Inc.,
570 Broadway, New York City.

Nibbling Machines

Gray Machine Co., Philadelphia.

Nibs—Lathe & Grinder Center

McKenna Metals Co., Latrobe, Pa.

Nickel

International Nickel Co., Inc., The, 67
Wall St., N. Y. C.

Nozzles—Sand Blasting

Norton Co., Worcester, Mass.

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Noble & Westbrook Mfg. Co., The, E.
Hartford, Conn.

Nut Machinery—Automatic Cold Pressed

Waterbury (Conn.) Farrel Foundry &
Machine Co., The.

Nuts—Cold Forged, Machine Screw, Wing or Castellated

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National Acme Co., The, Cleveland.
Parker-Kalon Corp., 200 Varick St.,
N. Y. C.

Progressive Mfg. Co., Torrington, Conn.

Russell, Burdsall & Ward Bolt & Nut
Co., Port Chester, N. Y.

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Elastic Stop Nut Corp., Union, N. J.
Standard Pressed Steel Co., Jenkin-
town, Pa.

Nuts—Special

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Garlock Packing Co., The, Palmyra,
N. Y.

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Houghton, E. F., & Co., Philadelphia,
Pa.

Penola, Inc., Pittsburgh, Pa.
Shell's Industrial Lubricants Div., Shell
Bldg., San Francisco, Shell Bldg.,
St. Louis, & 50 W. 50th St., N. Y. C.
Soocon-Vacuum Oil Co., Inc., 26 Broad-
way, New York City.

Standard Oil Co. (Indiana), Chicago,
Ill.
Stuart, D. A., Oil Co., Ltd., Chicago,
Ill.

Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd
St., N. Y. C.
Tide Water Associated Oil Co., 17 Bat-
tery Place, N. Y. C.

Oils—Fuel

Gulf Oil Corp., Gulf Refining Co.,
Pittsburgh.
Soocon-Vacuum Oil Co., Inc., 26 Broad-
way, New York City.

Standard Oil Co. (Indiana), Chicago,
Ill.

Sun Oil Co., Philadelphia.
Texas Company, The, 135 East 42nd
St., N. Y. C.
Tide Water Associated Oil Co., 17 Bat-
tery Place, N. Y. C.

Oils—Lubricating—See Lubricants

Ores—Iron

Cleveland-Cliffs Iron Co., The, Cleve-
land, Ohio.
Pickands Mather & Co., Cleveland,
Ohio.

Ores—Manganese

Cuban-American Manganese Corp., 122
East 42nd St., N. Y. C.

Ovens—Annealing, Jpanning

Holcroft & Co., Detroit, Mich.
Kirk & Blum Mfg. Co., The, Cin-
cinnati, Ohio.
Mahon, B. C., Co., Detroit, Mich.
Morrison Engineering Corp., Cleveland,
Ohio.

Stewart Furnace Div. Chicago Flexible
Shaft Co., Chicago, Ill.
Surface Combustion Corp., 2375 Dorr
St., Toledo, Ohio.

Ovens—Coke and By-Product Re- covery

Koppers Co., Engineering & Construc-
tion Div., Pittsburgh.

Ovens—Core and Mold

Holcroft & Co., Detroit.
Mahon, R. C., Co., Detroit, Mich.

Oxy-Acetylene Cutting—See Weld- ing

Oxygen

Air Reduction, 60 East 42nd St.,
N. Y. C.
Linde Air Products Company, The, 30
East 42nd St., N. Y. C.

Packing—Asbestos or Rubber

Carey, Philip, Co., The, Cincinnati,
Ohio.
Garlock Packing Co., The, Palmyra,
N. Y.

Hewitt Rubber Corp., Buffalo, N. Y.
Johns-Manville Corp., 22 East 40th St.,
New York City.

Manhattan Rubber Mfg. Div. of Ray-
bestos-Manhattan, Inc., The, 2
Towsend St., Passaic, N. J.

Packing—Felt

American Felt Co., Glenville, Conn.

Packing—Leather

Chicago (Ill.) Rawhide Mfg. Co., The,
1306 Elston Ave.
Garlock Packing Co., The, Palmyra,
N. Y.
Houghton, E. F., & Co., Philadelphia,
Pa.

Paint

Hercules Powder Co., Inc., Wilming-
ton, Del.
Hilo Varnish Corp., 42-60 Stewart Ave.,
Brooklyn, N. Y.

Koppers Co., Tar & Chemical Div.,
Pittsburgh, Pa.

National Lead Co., 111 Bdway., N. Y. C.

Paint—Acid Proof

American Chemical Paint Co., Ambler,
Pa.

Hercules Powder Co., Inc., Wilmington,
Del.

Pans—Tote

All-Steel-Equip Co., Inc., 702 John
St., Aurora, Ill.

Paper—Shipping

Sisalcraft Co., The, Chicago, Ill.

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 Chicago Perforating Co., 2440 W. 24th Place, Chicago, Ill.
 Diamond Mfg. Co., Wyoming, Pa.
 Erdle Perforating Co., Rochester, N. Y.
 Harrington & King Perforating Co., The, Chicago.
 Hendrick Mfg. Co., Carbondale, Pa.
 Mundt, Chas., & Sons, 59 Fairmount Ave., Jersey City, N. J.
 Wickwire Spencer Steel Co., 500 Fifth Ave., N. Y. C.

Pickling Compounds
 American Chemical Paint Co., Ambler, Pa.
 Houghton, E. F., & Co., Philadelphia, Pa.
Pickling Equipment
 Aetna-Standard Engineering Co., The, Youngstown, Ohio.
 Mesa Mch. Co., Pittsburgh.
 Wheeling (W. Va.) Bronze Casting Co.

Pickling Tank Linings
 Celcote Co., The, Cleveland, Ohio.
 National Lead Co., 111 Bdway, N. Y. C.

Pickling Tank Linings—Carbon
 National Carbon Co., Inc., Carbon Sales Div., Cleveland, Ohio.

Pig Iron
 Bethlehem (Pa.) Steel Company.
 Brooke, E. & G., Iron Co., Birdsboro, Pa.
 Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
 Hanna Furnace Corp., The, Ecorse, Detroit, Mich.
 Jackson (Ohio) Iron & Steel Co., The, Jones & Laughlin Steel Corp., Pittsburgh.
 Pickands Mather & Co., Cleveland, Ohio.
 Republic Steel Corp., Cleveland, Ohio.
 Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
 Wieman & Ward Co., The, Pittsburgh, Pa.

Pig Iron Casting Plants
 Heyl & Patterson, Inc., Pittsburgh.
Piling—Iron & Steel
 American Rolling Mill Co., The, Mid-dletown, Ohio.
 Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
 Inland Steel Co., Chicago, Ill.
 National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

Pillow Blocks
 Medart Co., The, St. Louis, Mo.
Pinions—Rolling Mill
 Continental Roll & Steel Foundry Co., East Chicago, Ind.
 Mesa Mch. Co., Pittsburgh.

Pinions—Wire and Rod
 Rathbone, A. R. & J., Palmer, Mass.
Pipe—Brass or Copper
 American Brass Co., The, Waterbury, Conn.
 Revere Copper & Brass, Inc., 230 Park Ave., New York City.

Pipe—Carbon
 National Carbon Co., Inc., Carbon Sales Div., Cleveland, Ohio.
Pipe—Cast Iron, B & S Flanged
 Wood, R. D., & Co., Philadelphia, Pa.

Pipe—Lead Lined
 National Lead Co., 111 Bdway., N. Y. C.

Pipe—Steel
 Albert & Davidson Pipe Corp., 2nd Ave., 50-51 St., Brooklyn, N. Y.
 Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
 American Rolling Mill Co., The, Mid-dletown, Ohio.
 Bethlehem (Pa.) Steel Company.
 Crane Co., Chicago, Ill.
 Greenpoint Iron & Pipe Co., Inc., 340 Stagg St., Brooklyn, N. Y.
 Jones & Laughlin Steel Corp., Pittsburgh.
 National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
 Republic Steel Corp., Cleveland, Ohio.
 Wheeling (W. Va.) Steel Corp., Youngstown (Ohio) Sheet & Tube Co., The.

Pipe Bending
 Harrisburg (Pa.) Steel Corp.
 National Lead Co., 111 Bdway., N. Y. C.
 Swan Engineering Co., Inc., Newark, N. J.

Pipe Fittings
 Crane Co., Chicago.
 Jarecki Mfg. Co., Erie, Pa.
Pipe Fittings—Molded Plastic
 Haitec Corp., Newark, Delaware.

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 Yoder Co., The, Cleveland, Ohio.
Pipe Threading & Cutting Machines
 Aetna-Standard Engineering Co., The, Youngstown, Ohio.
 Cox & Sons Co., The, Bridgeton, N. J.
 Jarecki Mfg. Co., Erie, Pa.
 Landis Mch. Co., Waynesboro, Pa.
 Murchey Machine & Tool Co., Detroit, Mich.
 Taylor-Wilson Mfg. Co., 25 Thomson St., McKees Rocks, Pa.

Piston Rings
 Koppers Co., American Hammered Piston Ring Div., Baltimore, Md.

Planers
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 Sellers, William, & Co., Inc., 1620 Hamilton St., Philadelphia, Pa.
Planers—Plate
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Plastics—Moulded
 Manhattan Rubber Mfg. Div. of Raybestos-Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.
 Metal Specialty Co., Cincinnati, Ohio.

Plates—Ground & Polished
 Holliday, W. J., & Co., Hammond, Ind.

Plates—Iron or Steel
 Alan Wood Steel Co., Conshohocken, Pa.
 American Rolling Mill Co., The, Mid-dletown, O.
 Bethlehem (Pa.) Steel Company.
 Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
 Granite City (Ill.) Steel Co.
 Holliday, W. J., & Co., Hammond, Ind.
 Inland Steel Co., Chicago.
 Jones & Laughlin Steel Corp., Pittsburgh.
 Ryerson, Joseph T., & Son, Inc., Chicago.
 Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
 Worth Steel Co., Claymont, Del.
 Youngstown (Ohio) Sheet & Tube Co., The.

Plates—Surface
 Challenge Machinery Co., Grand Haven, Mich.
 South Bend (Ind.) Tool & Die Co., 2406 So. Main St.

Platforms—Skid
 Lyon-Raymond Corporation, 137 Madison St., Greene, N. Y.
 Union Metal Mfg. Co., The, Canton, Ohio.

Plating—Chromium
 United Chromium Incorporated, 51 East 42nd St., N. Y. C.

Plugs—Core Hole
 Hubbard, M. D., Spring Co., 329 Central Ave., Pontiac, Mich.

Polishing Machines
 Udylite Corp., The, Detroit, Mich.

Polishing Wheels
 Siefen, J. J. Co., Detroit, Mich.

Powder Metal Products
 Moraine Products Div. of General Motors Corp., Dayton, Ohio.

Power Units—Gasoline-Electric, for Industrial Trucks
 Ready-Power Co., The, Detroit, Mich.

Power Units—Rotary
 Cushman Chuck Co., Hartford, Conn.
 New Departure Div., General Motors Sales Corp., Bristol, Conn.

Power Units—Straight Line
 Cushman Chuck Co., Hartford, Conn.

Precipitators—Cottrell Electric
 Research Corp., 405 Lexington Ave., New York City.

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Niagara Machine & Tool Works
 Buffalo, New York.

Presses—Briquetting—Metal Turnings
 Milwaukee (Wis.) Foundry Equipment Co.

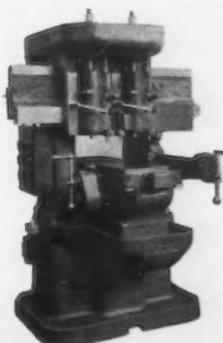
Presses—Broaching
 Farquhar, A. B. Co., Ltd., York, Pa.
 Olgeat Co., The, 1311 W. Bruce St., Milwaukee, Wis.

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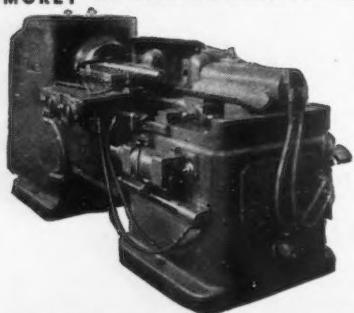
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Wood, R. D., & Co., Philadelphia, Pa.

Presses—Foot

Baird Mch. Co., The, Bridgeport, Conn.
Niagara Machine & Tool Works, Buffalo, N. Y.
Waterbury (Conn.) Farrel Foundry & Machine Co., The.

Presses—Forging

Ajax Mfg. Co., The, Cleveland, Ohio.
Birdsboro (Pa.) Steel Foundry & Machine Co.
Chambersburg (Pa.) Engineering Co.
Cleveland (Ohio) Punch & Shear Works Co., The.
Farquhar, A. B., Co., Ltd., York, Pa.
Mesta Mch. Co., Pittsburgh.
Morgan Engineering Co., The, Alliance, O.
Watson-Stillman Co., The, 103 Aldene Road, Roselle, N. J.

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Baldwin-Southwark Div., Baldwin Locomotive Wks., Philadelphia.
Birdsboro (Pa.) Steel Foundry & Machine Co.
Cincinnati (Ohio) Shaper Co., The.
Cleveland Crane & Engineering Co., The.
Steelweld Mchry. Div., 1115 East 283rd St., Wickliffe, Ohio.
Cleveland (Ohio) Punch & Shear Works Co., The.
Dreis & Krump Mfg. Co., Chicago.
Farquhar, A. B., Co., Ltd., York, Pa.
Ferracutte Machine Co., Bridgeton, New Jersey.
Lake Erie Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y.
Niagara Mch. & Tool Wks., Buffalo, N. Y.

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Zeh & Hahnemann Co., Newark, N. J.

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Chambersburg (Pa.) Engineering Co.
Denison Engineering Co., 108 W. Chestnut St., Columbus, Ohio.
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Farrel-Birmingham Co., Inc., Ansonia, Conn.
Hannfin Mfg. Co., Chicago, Ill.
Hydraulic Press Mfg. Co., The, Mt. Gilead, Ohio.
Lake Erie Engineering Corp., 68 Kenmore Sta., Buffalo, N. Y.
Logemann Bros. Co., Milwaukee, Wis.
Mesta Mch. Co., Pittsburgh.
Morgan Engineering Co., The, Alliance, O.
Olgegear Co., The, 1311 W. Bruce St., Milwaukee.
Watson-Stillman Co., The, 103 Aldene Road, Roselle, N. J.
Wood, R. D., & Co., Philadelphia, Pa.

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Cleveland Crane & Engineering Co., The.
Steelweld Mchry. Div., 1115 East 283rd St., Wickliffe, Ohio.
Cleveland (Ohio) Punch & Shear Works Co., The.
Farquhar, A. B., Co., Ltd., York, Pa.
Farrel-Birmingham Co., Inc., Ansonia, Conn.
Ferracutte Machine Co., Bridgeton, New Jersey.
Henry & Wright Mfg. Co., The, Hartford, Conn.
Hyman, Joseph, & Sons, Phila.
L & J Press Corp., Elkhart, Ind.
New Albany (Ind.) Mch. Mfg. Co.
Niagara Machine & Tool Wks., Buffalo, N. Y.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.

Thomas Mch. Mfg. Co., Pittsburgh.
V & O Press Co., Hudson, N. Y.
Waterbury (Conn.) Farrel Fdry. & Mch. Co., The.

Zeh & Hahnemann Co., Newark, N. J.

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Olgegear Co., The, 1311 W. Bruce St., Milwaukee, Wis.

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Physicists Research Co., Ann Arbor, Mich.

Projectors—Contour Measuring
Jones & Lamson Machine Co., Springfield, Vt.

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Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Dodge Mfg. Corp., Mishawaka, Ind.
Falls Clutch & Mchry. Co., The, Cuyahoga Falls, Ohio.

Pulleys—Friction Clutch

Dodge Mfg. Corp., Mishawaka, Ind.

Pulleys—Magnetic

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Dings Magnetic Separator Co., 517 East Smith St., Milwaukee, Wis.
Stearns Magnetic Mfg. Co., 635 So. 28th St., Milwaukee.

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Tomkins-Johnson Co., The, Jackson, Mich.

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Watson-Stillman Co., The, 103 Aldene Road, Roselle, N. J.

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Niagara Machine & Tool Works, Buffalo, N. Y.
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Inland Steel Co., Chicago, Ill.
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Frank, M. K., 480 Lexington Ave., N. Y. C.
Hyman-Michaels Co., Chicago.
Iron & Steel Products, Inc., Chicago.
Sherwood, E. C., 50 Church St., N. Y. C.

PRODUCTS INDEX

Ramers

Carboly Co., Inc., 11153 East 8-Mile Road, Detroit, Mich.
Cleveland (Ohio) Twist Drill Co., The, Gisholt Machine Co., Madison, Wisconsin.
Greenfield (Mass.) Tap & Die Corp., Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Div., Niles-Bement-Pond Co., West Hartford, Conn.

Ramers—Expansion

Girling Tool Co., The, Detroit.
Greenfield (Mass.) Tap & Die Corp.

Reaming Machines

Blanchard Machine Co., Cambridge, Mass.

Recorders—Temperature

Brown Instrument Co., The, Philadelphia, Pa.
Hoskins Mfg. Co., Detroit, Mich.
Leeds & Northrup Co., 4956 Stenton Ave., Phila., Pa.

Refractories

Babcock & Wilcox Co., The, 85 Liberty St., N. Y. C.
Bay State Abrasive Products Co., Westboro, Mass.
Carborundum Co., The, Perth Amboy, N. J.
Illinois Clay Products Co., Joliet, Ill.
Norton Co., Worcester, Mass.

Regulators—Compressed Gas

Air Reduction, 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

Reinforcement Fabric—Concrete

Pittsburgh (Pa.) Steel Co.
Wickwire Spencer Steel Co., 500 Fifth Ave., N. Y. C.

Rings—Iron or Steel

Dresser Mfg. Co., Bradford, Pa.
Midvale Co., The, Nicetown, Phila., Pa.
Standard Steel Wks. Div., The Baldwin Locomotive Works, Phila., Pa.

Rings—Welded

King Fifth Wheel Co., 2915 N. Second St., Philadelphia.

Rivet Sets

Cleveland (Ohio) Punch & Shear Works Co., The.
Cleveland Steel Tool Co., The, 660 E. 82nd St., Cleveland, Ohio.

Riveting Machines

Hannifin Mfg. Co., Chicago, Ill.
Shuster, F. B., Co., The, New Haven, Ct.
Tomkins-Johnson Co., The, Jackson, Mich.

Rivets

American Screw Co., Providence, R. I.
Clark Bros. Bolt Co., Milldale, Conn.
Republic Steel Corp., Cleveland, Ohio.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.

Rods—Aluminum

Aluminum Co. of America, Pittsburgh.

Rods—Brass, Bronze, Nickel, Silver

American Brass Co., The, Waterbury, Conn.
Phosphor Bronze Smelting Co., The, Phila., Pa.
Revere Copper & Brass, Inc., 230 Park Ave., New York City.
Titan Metal Mfg. Co., Bellefonte, Pa.

Rods—Drill

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
Kidd Drawn Steel Co., Aliquippa, Pa.

Rods—Magnesium Alloys

American Magnesium Corp., 1701 Gulf Bldg., Pittsburgh.
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

Rods—Threaded

Eastern Machine Screw Corp., The, New Haven, Conn.

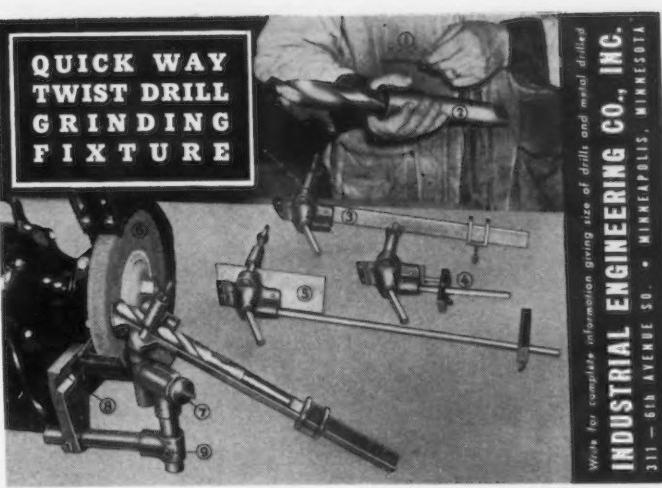
Roller Levelers—Backed Up

McKay Machine Co., The, Youngstown, Ohio.

Rolling Mill Machinery

Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Birdsboro (Pa.) Steel Foundry & Machine Co.
Cold Metal Process Co., The, Youngstown, Ohio.
Continental Roll & Steel Foundry Co., East Chicago, Ind.
Farrel-Birmingham Co., Inc., Ansonia, Ct.
Lewis Foundry & Machine Div. of Blaw-Knox Co., Pittsburgh.
McKay Machine Co., The, Youngstown, Ohio.
Mesta Mch. Co., Pittsburgh.
Morgan Construction Co., Worcester, Mass.

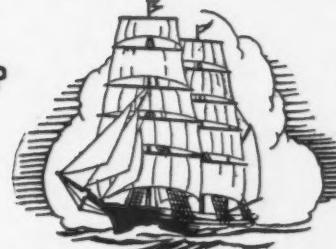
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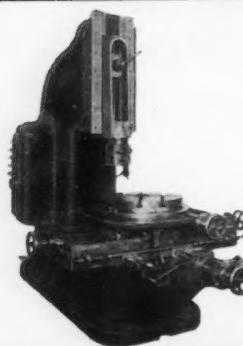


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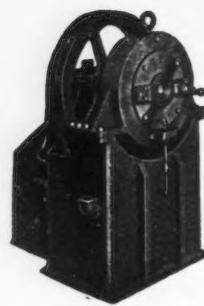
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The, Cleveland.
Peerless Machine Co., 1613 Junction
Ave., Racine, Wis.

Sawing Machines—Metal-Band

Armstrong-Blum Mfg. Co., Chicago, Ill.
Atkins, E. C. & Co., 406 So. Illinois
St., Indianapolis, Ind.
Continental Machines, Inc., 1311 S.
Washington Ave., Minneapolis, Minn.
Wells Mfg. Corp., Three Rivers, Mich.

Sawing Machines—Power Hack

Armstrong-Blum Mfg. Co., Chicago.
Atkins, E. C. & Co., 406 So. Illinois
St., Indianapolis, Ind.
Peerless Machine Co., 1613 Junction
Ave., Racine, Wis.

Saws—Band for Metal

Armstrong-Blum Mfg. Co., Chicago.
Atkins, E. C. & Co., 406 So. Illinois
St., Indianapolis, Ind.
Continental Machines, Inc., 1311 S.
Washington Ave., Minneapolis, Minn.
Dissston, Henry, & Sons, Inc., Philadelphia, Pa.
Peerless Machine Co., 1613 Junction
Ave., Racine, Wis.
Thompson, Henry G. & Son, Co., The
New Haven, Conn.
Wells Mfg. Corp., Three Rivers, Mich.

Saws—Cold Saw

Atkins, E. C. & Co., 406 So. Illinois
St., Indianapolis, Ind.
Espin-Lucas Machine Works, Philadelphia, Pa.
Moth & Merryweather Machinery Co.,
The, Cleveland.
Peerless Machine Co., 1613 Junction
Ave., Racine, Wis.
Tabor Mfg. Co., Philadelphia.

Saws—Friction

Atkins, E. C. & Co., 406 So. Illinois
St., Indianapolis, Ind.
Dissston, Henry, & Sons, Inc., Philadelphia, Pa.

Saws—Hack Saw Blades

Armstrong-Blum Mfg. Co., Chicago.
Atkins, E. C. & Co., 406 So. Illinois
St., Indianapolis, Ind.
Dissston, Henry, & Sons, Inc., Philadelphia, Pa.
Peerless Machine Co., 1613 Junction
Ave., Racine, Wis.
Thompson, Henry G. & Son, Co., The
New Haven, Conn.

Saws—Hot Metal

Ajax Mfg. Co., The, Cleveland.
Atkins, E. C. & Co., 406 So. Illinois
St., Indianapolis, Ind.
Dissston, Henry, & Sons, Inc., Philadelphia, Pa.

Saws—Portable Electric

Black & Decker Mfg. Co., The, Towson,
Md.

Saws—Slotting

Atkins, E. C. & Co., 406 So. Illinois
St., Indianapolis, Ind.
Greenfield (Mass.) Tap & Die Corp.
Peerless Machine Co., 1618 Junction
Ave., Racine, Wis.

Scales

Fairbanks, Morse & Co., Chicago.

Scrap Balers—See Baling Presses

Scrap Bundling Machines

Cox & Sons Co., The, Bridgeton, N. J.

Scrap-Iron & Steel

Dreifus, Charles, Co., The, Philadelphia, Pa.

Screens—Foundry

Allis-Chalmers Mfg. Co., Milwaukee,
Wis.
Wickwire Brothers, Inc., Cortland, New
York.

Screens—Perforated Metal

Chicago Perforating Co., 2440 W. 24th
Place, Chicago, Ill.

Diamond Mfg. Co., Wyoming, Pa.
Erdle Perforating Co., Rochester, New
York.

Harrington & King Perforating Co.,
The, Chicago, Ill.

Hendrick Mfg. Co., Carbondale, Pa.
Mundt, Chas. A., Sons, 59 Fairmount
Ave., Jersey City, N. J.

Screens—Woven Wire

Ludlow-Saylor Wire Co., St. Louis, Mo.
Wickwire Brothers, Inc., Cortland, New
York.

Wickwire Spencer Steel Co., 500 Fifth
Ave., N. Y. C.

Screw Driving Tools

North Bros. Mfg. Co., Philadelphia, Pa.

Screw Machine Products

Beach Willard C., Air Brush Co., Har-
rison, N. J.
Blake & Johnson Co., The, Waterville,
Conn.
Eastern Mch. Screw Corp., New Haven,
Ct.

Mid-West Screw Products Co., 20 St.
George St., St. Louis, Mo.

Miles, Franklin S., 2422-28 N. Mascher
St., Phila., Pa.

National Acme Co., The, Cleveland.
New Britain-Gridley Machine Div., The
New Britain Machine Co., New
Britain, Conn.

Olson Mfg. Co., Worcester, Mass.
Ottemiller, Wm. H., Co., Inc., York,
Pa.

Peek Spring Co., The, Plainville, Conn.
Penhurst Machine Co., Cleveland, Ohio.
R & L Tools, Philadelphia, Pa.

Shimer, Samuel J., & Sons, Inc., Mil-
ton, Pa.

Screw Machine Tools

Hardinge Brothers, Inc., Elmira, New
York.
R & L Tools, Philadelphia.

Screw Machinery—Automatic

Acme Machine Tool Co., The, Cincinnati,
Ohio.
Brown & Sharpe Mfg. Co., Providence,
R. I.
Cleveland (Ohio) Automatic Machine
Co., The.
Cone Automatic Machine Co., Inc.,
Windsor, Vt.
National Acme Co., The, Cleveland.
New Britain-Gridley Machine Div.,
The, New Britain Machine Co., New
Britain, Conn.

Screw Machinery—Hand

Gisholt Machine Co., Madison, Wis.
Hardinge Brothers, Inc., Elmira, New
York.
Jones & Lamson Machine Co., Spring-
field, Vt.
Warner & Swasey Co., The, Cleveland.

Screw Plates

Greenfield (Mass.) Tap & Die Corp.

Screws—Cap, Set, Safety Set & Ma- chine

Blake & Johnson Co., The, Waterville,
Conn.

Cleveland (Ohio) Cap Screw Co., The.
Lamson & Sessions Co., The, Cleveland.
Mid-West Screw Products Co., 20 St.
George St., St. Louis, Mo.

National Acme Co., The, Cleveland.
Ottemiller, Wm. H., Co., Inc., York,
Pa.

Parker-Kalon Corp., 200 Varick St.,
New York City.

Progressive Mfg. Co., The, Torrington,
Conn.

Russell, Burdsall & Ward Bolt & Nut
Co., Port Chester, N. Y.

Shimer, Samuel J., & Sons, Inc., Mil-
ton, Pa.

Standard Pressed Steel Co., Jenkin-
town, Pa.

Triplex Screw Co., Cleveland.

Screws—Recessed Head

American Screw Co., Providence, R. I.
Lamson & Sessions Co., The, Cleveland,
Ohio.

Parker-Kalon Corp., 200 Varick St.,
New York City.

Russell, Burdsall & Ward Bolt & Nut
Co., Port Chester, N. Y.

Screws—Self Tapping Drive

Parker-Kalon Corp., 200 Varick St.,
New York City.

Shakeproof Lock Washer Co., 2525 N.
Keeler Ave., Chicago.

Separators—Magnetic

Dings Magnetic Separator Co., 517, East
Smith St., Milwaukee.

Ohio Electric Mfg. Co., The, 5908
Maurice Ave., Cleveland.

Stearns Magnetic Mfg. Co., 635 S. 28th
St., Milwaukee.

Shafting

Bliss & Laughlin, Inc., Harvey, Ill.;
Buffalo, N. Y.

Copperweld Steel Co., Warren, Ohio.

Jones & Laughlin Steel Corp., Pitts-
burgh.

Monarch Steel Co., Indianapolis, Ind.

Ryerson, Jos. T., & Son, Inc., Chicago.

Union Drawn Steel Div., Republic Steel
Corp., Massillon, Ohio.

Wykoff Drawn Steel Co., Pittsburgh.

Shapers

Cincinnati (Ohio) Shaper Co., The.

Hendey Machine Co., Torrington, Conn.

Shapers—Vertical

Pratt & Whitney Div., Niles-Bement-

Pond Co., West Hartford, Conn.

Shear Blades & Knives

American Shear Knife Co., Homestead,
Pa.

Atkins, E. C. & Co., 408 So. Illinois St.,
Indianapolis, Ind.

Canion Foundry & Mch. Co., The, Div.

of the Hill Acme Co., 6400 Break-
water Ave., Cleveland, Ohio.

Cleveland (Ohio) Punch & Shear Works
Co., The.

Heppenstall Co., Pittsburgh.

Wapakoneta (Ohio) Machine Co.

Shearing Machines

Aetna-Standard Engineering Co., The,

Youngstown, Ohio.

Rorsch & Co., Cambridge City, Ind.

Beverly Shear Co., Chicago, Ill.

Buffalo (N. Y.) Forge Co., 492 Broad-
way.

PRODUCTS INDEX

Canton Foundry & Mch. Co., The, Div. of The Hill Arm Co., 6400 Breakwater Ave., Cleveland, Ohio.
 Cincinnati (Ohio) Shaper Co.
 Cleveland (Ohio) Punch & Shear Works Co., The.
 Federal Bearings Co., Inc., The, Poughkeepsie, N. Y.
 McKay Machine Co., The, Youngstown, Ohio.
 Mesta Machine Co., Pittsburgh, Pa.
 Morgan Engineering Co., The, Alliance, O.
 Niagara Machine & Tool Works, Buffalo, New York.
 Schatz Mfg. Co., The, Poughkeepsie, N. Y.
 United Engineering & Fdry. Co., Ptg., Yoder Co., The, Cleveland, Ohio.

Shearing Machines—Rotary
 Cleveland (Ohio) Punch & Shear Works Co.
 Niagara Machine & Tool Works, Buffalo, N. Y.

Shearing Machines—Squaring
 Cincinnati (Ohio) Shaper Co., The.
 Cleveland (Ohio) Punch & Shear Works Co., The.
 Niagara Mach. & Tool Wks., Buffalo, N. Y.

Sheet Bars
 Andrews Steel Co., The, Newport, Ky.

Sheet Lifters
 Cullen-Friestd Co., 1303 S. Kilbourn Ave., Chicago.

Sheet Metal Fabrication
 Kirk & Blum Mfg. Co., The, Cincinnati, Ohio.

Sheet Metal Machinery
 Beverly Shear Co., Chicago, Ill.
 Cincinnati (Ohio) Shaper Co., The.
 Cleveland (Ohio) Punch & Shear Works Co., The.
 Dreis & Krump Mfg. Co., Chicago.
 Ferracutte Machine Co., Bridgeton, New Jersey.
 New Albany (Ind.) Mch. Mfg. Co.
 Niagara Mach. & Tool Wks., Buffalo, N. Y.
 V & O Press Co., Hudson, N. Y.
 Waterbury (Conn.) Farrel Foundry & Machine Co., The.
 Yoder Co., The, Cleveland, Ohio.

Sheets—Aluminum
 Aluminum Co. of America, Pittsburgh.

Sheets—Black
 American Rolling Mill Co., The, Middletown, O.
 Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
 Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
 Granite City (Ill.) Steel Co.
 Ingersoll Steel & Disc. Div. Borg-Warner Corp., Chicago.
 Inland Steel Co., Chicago.
 Jones & Laughlin Steel Corp., Pittsburgh.
 Newport (Ky.) Rolling Mill Co., The, Div. of The Andrews Steel Co.
 Republic Steel Corp., Cleveland, Ohio.
 Ryerson, Jos. T., & Son, Inc., Chicago.
 Scully Steel Products Co. (U. S. Steel Corp. Subsidiary), Chicago.
 Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
 Weirton (W. Va.) Steel Co.

Sheets—Blue Annealed
 Alan Wood Steel Co., Conshohocken, Pa.

American Rolling Mill Co., The, Middletown, O.
 Bethlehem (Pa.) Steel Company.
 Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
 Granite City (Ill.) Steel Co.
 Ryerson, Jos. T., & Son, Inc., Chicago.

Sheets—Brass, Bronze, Copper, Nickel Silver or Phosphor Bronze
 American Brass Co., The, Waterbury, Conn.
 Phosphor Bronze Smelting Co., The, Philadelphia, Pa.
 Revere Copper & Brass, Inc., 230 Park Ave., New York City.

Sheets—Chromium Plated
 American Nickeloid Co., 1312 North Second St., Peru, Ill.

Sheets—Coated
 American Nickeloid Co., 1312 North Second St., Peru, Ill.

Sheets—Copper Steel
 American Rolling Mill Co., The, Middletown, Ohio.
 Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
 Granite City (Ill.) Steel Co.
 Inland Steel Co., Chicago.
 Newport (Ky.) Rolling Mill Co., The, Div. of The Andrews Steel Co.
 Republic Steel Corp., Cleveland, Ohio.
 Wheeling (W. Va.) Steel Corp.

Sheets—Electrical
 Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
 American Rolling Mill Co., The, Middletown, Ohio.
 Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
 Granite City (Ill.) Steel Co.
 Newport (Ky.) Rolling Mill Co., The, Div. of The Andrews Steel Co.
 Republic Steel Corp., Cleveland, Ohio.

Sheets—For Drawing and Stamping
 American Rolling Mill Co., The, Middletown, Ohio.
 Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
 Granite City (Ill.) Steel Co.
 Inland Steel Co., Chicago, Ill.
 Newport (Ky.) Rolling Mill Co., The, Div. of The Andrews Steel Co.
 Republic Steel Corp., Cleveland, Ohio.
 Ryerson, Jos. T., & Son, Inc., Chicago.
 Worth Steel Co., Claymont, Del.

Sheets—Full Finished, for Motor Car, Furniture, Enameling
 American Rolling Mill Co., The, Middletown, Ohio.
 Bethlehem (Pa.) Steel Co.
 Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
 Granite City (Ill.) Steel Co.
 Great Lakes Steel Corp., Ecorse, Detroit, Mich.
 Holliday, W. J., & Co., Hammond, Ind.
 Inland Steel Co., Chicago, Ill.
 Jones & Laughlin Steel Corp., Pittsburgh, Pa.
 Newport (Ky.) Rolling Mill Co., The, Div. of The Andrews Steel Co.
 Republic Steel Corp., Cleveland, Ohio.
 Ryerson, Jos. T., & Son, Inc., Chicago.
 Weirton (W. Va.) Steel Co.
 Youngstown (Ohio) Sheet & Tube Co., The.

Sheets—Galvanized
 American Rolling Mill Co., The, Middletown, Ohio.
 Bethlehem (Pa.) Steel Company.
 Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
 Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
 Continental Steel Corp., Kokomo, Ind.
 Granite City (Ill.) Steel Co.
 Great Lakes Steel Corp., Ecorse, Detroit, Mich.
 Holliday, W. J., & Co., Hammond, Ind.
 Inland Steel Co., Chicago.
 Newport (Ky.) Rolling Mill Co., The, Div. of The Andrews Steel Co.
 Republic Steel Corp., Cleveland, Ohio.
 Ryerson, Jos. T., & Son, Inc., Chicago.
 Superior Sheet Steel Co., The, Canton, Ohio.
 Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
 Weirton (W. Va.) Steel Co.
 Youngstown (Ohio) Sheet & Tube Co., The.

Sheets—Lead
 National Lead Co., 111 Bdway, N. Y. C.

Sheets—Long Terne
 American Rolling Mill Co., The, Middletown, Ohio.
 Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
 Newport (Ky.) Rolling Mill Co., The, Div. of The Andrews Steel Co.
 Superior Sheet Steel Co., The, Canton, Ohio.

Sheets—Magnesium Alloys
 American Magnesium Corp., 1701 Gulf Bldg., Pittsburgh.
 Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

Sheets—Stainless
 Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
 American Rolling Mill Co., The, Middletown, Ohio.
 Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
 Crucible Steel Co. of America, Chrysler Bldg., New York City.
 Republic Steel Corp., Cleveland, Ohio.
 Ryerson, Jos. T., & Son, Inc., Chicago.

Sheets—Stainless Clad
 Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
 Granite City (Ill.) Steel Co.
 Ingersoll Steel & Disc Div. Borg-Warner Corp., Chicago, Ill.
 Jessep Steel Co., Washington, Pa.

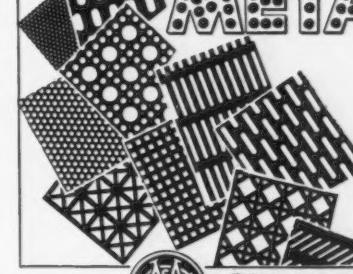
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Granite City (Ill.) Steel Co.
Newport (Ky.) Rolling Mill Co., The, Div. of The Andrews Steel Co.

Shims

Laminated Shim Co., Inc., Glenbrook, Conn.

Shop Furniture

New Britain-Gridley Machine Div., The New Britain Machine Co., New Britain, Conn.

Shower Bath Equipment

Bradley Washfountain Co., Milwaukee, Wis.

Shutters—Steel & Wood Bi-Folding

Kinnear Mfg. Co., The, Columbus, Ohio.

Silico-Manganese

Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

Silicon Metal & Alloys

Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

Sine Bars

Ford Motor Co. (C. E. Johansson Div.), Dearborn, Mich.

Slings—Chain

American Chain & Cable Co., Inc., York, Pa.

Slings—Wire Rope

Broderick & Bascom Rope Co., St. Louis, Mo.
Macwhye Co., Kenosha, Wise.
Roebeling's, John A., Sons Co., Trenton, N. J.

Slotters

Lobdell Car Wheel Co., Nazel Hammer Div., Wilmington, Del.

Soaking Pits

Amstler-Morton Co., The, Pittsburgh, Pa.

Solder

Kester Solder Co., Chicago, Ill.

Special Machinery

Baldwin-Southwark Div., Baldwin Locomotive Wks., Philadelphia.
Bausch Machine Tool Co., Springfield, Mass.

Birdsboro (Pa.) Steel Foundry & Machine Co.

Bullard Co., The, Bridgeport, Conn.

Cleveland (Ohio) Automatic Machine Co., The.

Coutier, James, Machine Co., The, Bridgeport, Conn.

Davis & Thompson Co., Milwaukee, Wis.

Denison Engineering Co., The, 108 W. Chestnut St., Columbus, Ohio.

Durabil Tool & Mfg. Corp., 38-75 Eleventh St., Long Island City, N. Y.

Eastern Tool & Mfg. Co., Bloomfield, N. J.

Fidelity Machine Co., Philadelphia, Pa.

Hartford (Conn.) Special Machinery Co., The.

Hydro-Blast Corp., The, Chicago, Ill.

Morgan Engineering Co., The, Alliance, Ohio.

Nelson, A. H., Machine Co., Bridgeport, Conn.

Taft-Pelrice Mfg. Co., The, Woonsocket, R. I.

Thomas Mch. Mfg. Co., Pittsburgh.

Torrington (Conn.) Mfg. Co., The.

Weatherly (Pa.) Foundry & Mfg. Co.

Whiting Corp., Harvey, Ill.

Wood, R. D., & Co., Philadelphia, Pa.

Speed Reducers

Link-Belt Co., 2045 West Hunting Park Ave., Phila., Pa.

Philadelphia (Pa.), Gear Works.

Poole Foundry & Mch. Co., Baltimore, Md.

Twin Disc Clutch Co., Racine, Wis.

Spiegeleisen

Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

Spikes—Track

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Jones & Laughlin Steel Corp., Pittsburgh.

Spindles—Boring

Sheffield Corp., The, Gage Div., Dayton, Ohio.

Spindles—Grinding

Ex-Cell-O Corp., 1210 Oakman Blvd., Detroit, Mich.

Spinners

American Aluminum Ware Co., 372 Jelliff Ave., Newark, N. J.

Craft Mfg. Co., Chicago, Ill.

Splice Bars

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Spooling Machinery—Wire

Fidelity Machine Co., Philadelphia, Pa.

Spray Booths—Paint

Mahan, R. C., Co., Detroit, Mich.

Spring Making Machinery

Baird Mch. Co., The, Bridgeport, Conn.

Torrington (Conn.) Mfg. Co., The.

Springs

Accurate Spring Mfg. Co., 3819 W. Lake St., Chicago, Ill.

American Spring & Mfg. Corp., Holly, Mich.

American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Cleveland.

Barnes-Gibson-Raymond, Detroit Plant, Div. of Associated Spring Corp.

Barnes, Wallace Co. Div. of Associated Spring Corp., Bristol, Conn.

Cook Plant of Barnes-Gibson-Raymond, Div. of Associated Spring Corp., Ann Arbor, Mich.

Cuyahoga Spring Co., The, Cleveland.

Dunbar Bros. Co., Div. of Associated Spring Corp., Bristol, Conn.

Hubbard, M. D., Spring Co., 329 Central Ave., Pontiac, Mich.

Hunter Pressed Steel Co., Lansdale, Pa.

Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.

Mercer Spring Co., 109 Mercer St., New York City.

Muehlhausen Spring Corp., Logansport, Ind.

Raymond Mfg. Co., Div. of Associated Spring Corp., Corry, Pa.

U. S. Steel Wire Spring Co., Cleveland, O.

Wickwire Spencer Steel Co., 500 Fifth Ave., N. Y. C.

Sprockets

Link-Belt Co., 300 West Pershing Rd., Chicago, Ill.

Morse Chain Co., Ithaca, N. Y.

Whitney Chain & Mfg. Co., Hartford, Ct.

Stampings

Accurate Spring Mfg. Co., 3819 W. Lake St., Chicago, Ill.

American Aluminum Ware Co., 372 Jelliff Ave., Newark, N. J.

Barnes-Gibson-Raymond, Detroit Plant, Div. of Associated Spring Corp.

Barnes, Wallace Co., Div. of Associated Spring Corp., Bristol, Conn.

Budd, Edward G., Mfg. Co., Phila., Pa.

Champion Sheet Metal Co., Inc., cor. Squires & Duane Sts., Cortland, N. Y.

Cook Plant of Barnes-Gibson-Raymond, Div. of Associated Spring Corp., Ann Arbor, Mich.

Craft Mfg. Co., Chicago, Ill.

Davis Brake Beam Co., Laurel Ave. & A St., Johnstown, Pa.

Detroit (Mich.) Stamping Co.

Dunbar Bros. Co., Div. of Associated Spring Corp., Bristol, Conn.

Eastern Tool & Stamping Co., Inc., Saugus, Mass.

Greist Mfg. Co., The, 646 Blake St., New Haven, Conn.

Heintz Mfg. Co., Philadelphia, Pa.

Hubbard, M. D., Spring Co., 329 Central Ave., Pontiac, Mich.

Hunter Pressed Steel Co., Lansdale, Pa.

Lansing (Mich.) Stamping Co., So. Penn Ave.

Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.

Metal Specialty Co., Cincinnati, Ohio.

New England Pressed Steel Co., Natick, Mass.

Parish Pressed Steel Co., Reading, Pa.

Raymond Mfg. Co., Div. of Associated Spring Corp., Corry, Pa.

Sessions, J. H., & Son, Hooker Court, Bristol, Conn.

Shakeproof Lock Washer Co., 2525 N. Keeler Ave., Chicago.

Specialties Mfg. Co., 35 Farrand St., Bloomfield, N. J.

Stanley Works, The, New Britain, Conn.

Torrington (Conn.) Company.

Transue & Williams Steel Forging Corp., Alliance, Ohio.

Whitehead Stamping Co., 1669 W. Lafayette Blvd., Detroit, Mich.

Worcester (Mass.) Pressed Steel Co., 104 Barber Ave.

Worcester (Mass.) Stamped Metal Co., 6 Hunt St.

Stamps—Steel

Cunningham, M. E., Co., Pittsburgh, Pa.

Noble & Westbrook Mfg. Co., The, E. Hartford, Conn.

Staples—Wire

Wickwire Brothers, Inc., Cortland, N. Y.

Starters—Motor

Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Steel—Alloy

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.

Andrews Steel Co., The, Newport, Ky.

Beals-McCarthy & Rogers, Inc., Buffalo, New York.

Belleville (Pa.) Steel Company.

Brown-Wales Co., Boston, Mass.

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Monarch Steel Co., Indianapolis, Ind.

Timken Roller Bearing Co., The, Canton, O.

Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.

Union Drawn Steel Div., Republic Steel Corp., Massillon, Ohio.

Wyckoff Drawn Steel Co., Pittsburgh.

Cleveland (Ohio) Twist Drill Co., The.

Crucible Steel Co. of America, Chrysler Bldg., N. Y. C.

Ingersoll Steel & Disc Div., Borg-Warner Corp., Chicago.

Jessop Steel Co., Washington, Pa.

Latrobe (Pa.) Electric Steel Co.

Vanadium-Alloys Steel Co., Latrobe, Pa.

Cleveland (Ohio) Twist Drill Co., The.

Bliss & Laughlin, Inc., Harvey, Ill.; Buffalo, N. Y.

Holliday, W. J., & Co., Hammond, Ind.

Jones & Laughlin Steel Corp., Pittsburgh.

Monarch Steel Co., Indianapolis, Ind.

Timken Roller Bearing Co., The, Canton, O.

Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.

Union Drawn Steel Div., Republic Steel Corp., Massillon, Ohio.

Youngstown (Ohio) Sheet & Tube Co., The.

Steel—Screw Stock

Bliss & Laughlin, Inc., Harvey, Ill.; Buffalo, N. Y.

Holliday, W. J., & Co., Hammond, Ind.

Jones & Laughlin Steel Corp., Pittsburgh.

Monarch Steel Co., Indianapolis, Ind.

Timken Roller Bearing Co., The, Canton, O.

Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.

Union Drawn Steel Div., Republic Steel Corp., Massillon, Ohio.

Youngstown (Ohio) Sheet & Tube Co., The.

Steel—Spring

Barnes-Gibson-Raymond, Detroit Plant,

Div. of Associated Spring Corp.

Barnes, Wallace Co., Div. of Associated Spring Corp., Bristol, Conn.

Cold Metal Process Co., The, Youngstown, Ohio.

Jones & Laughlin Steel Corp., Pittsburgh.

Monarch Steel Co., Indianapolis, Ind.

Timken Roller Bearing Co., The, Canton, O.

Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.

Union Drawn Steel Div., Republic Steel Corp., Massillon, Ohio.

Youngstown (Ohio) Sheet & Tube Co., The.

Steel—Cobalt

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.

American Rolling Mill Co., The, Midlothian, Ohio.

Andrews Steel Co., The, Newport, Ky.

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.

Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.

Crucible Steel Co. of America, Chrysler Bldg., N. Y. C.

Dissston, Henry, & Sons, Inc., Philadelphia, Pa.

Frasse, Peter A., & Co., Inc., 17 Grand St., New York City.

Griffin Mfg. Co., Erie, Pa.

Inland Steel Co., Chicago.

Jones & Laughlin Steel Corp., Pittsburgh.

Monarch Steel Co., Indianapolis, Ind.

Timken Roller Bearing Co., The, Canton, O.

Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.

Union Drawn Steel Div., Republic Steel Corp., Massillon, Ohio.

Youngstown (Ohio) Sheet & Tube Co., The.

Steel—Cold Drawn

Beals-McCarthy & Rogers, Inc., Buffalo, N. Y.

Bliss & Laughlin, Inc., Harvey, Ill.

Buffalo, N. Y. C.

Monarch Steel Co., Indianapolis, Ind.

Union Drawn Steel Div., Republic Steel Corp., Massillon, Ohio.

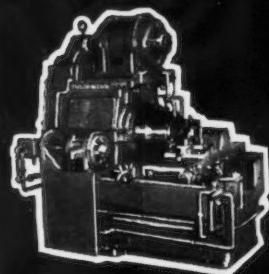
Youngstown (Ohio) Sheet & Tube Co., The.

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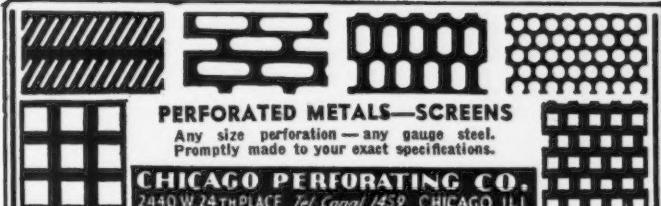
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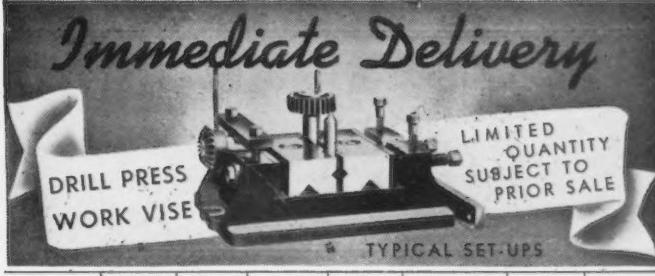
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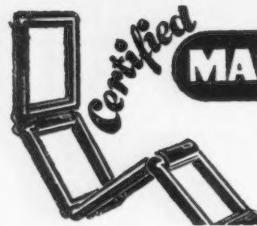


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Fig. 232

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Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Inland Steel Co., Chicago, Ill.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Republic Steel Corp., Cleveland, Ohio.
Ryerson, Jos. T., & Son, Inc., Chicago, Ill.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Weirton (W. Va.) Steel Co.

Steel—Tool

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
Bethlehem (Pa.) Steel Company.
Boker, H., & Co., Inc., 101 Duane St., New York City.
Carpenter Steel Co., The, 121 W. Bern St., Reading, Pa.
Copperhill Steel Co., Warren, Ohio.
Crucible Steel Co. of America, Chrysler Bldg., N. Y. C.
Darwin & Milner, Inc., Cleveland.
Dissston, Henry, & Sons, Inc., Philadelphia, Pa.
Firth-Sterling Steel Co., McKeesport, Pa.
Irgersoll Steel & Disc Div. Borg-Warner Corp., Chicago.
Jessop Steel Co., Washington, Pa.
Kidd Drawn Steel Co., Aliquippa, Pa.
Latrobe (Pa.) Electric Steel Co.
Midvale Co., The, Nicetown, Phila., Pa.
Ryerson, Jos. T., & Son, Inc., Chicago.
Tennessee Coal, Iron & Railroad Co. (U. S. Steel Corp. Subsidiary), Birmingham, Ala.
Vanadium-Alloys Steel Co., Latrobe, Pa.
Wheelock, Lovejoy & Co., Inc., Cambridge, Mass.

Steel Mill Equipment

Wellman Engineering Co., The, Cleveland.

Stitching Machines—Metal

Harris-Seybold-Potter Co., Dayton, O.

Stokers

Babcock & Wilcox Co., The, 85 Liberty St., N. Y. C.
Whiting Corp., Harvey, Ill.

Stones—Abrasive-Oil

Bay State Abrasive Products Co., Westboro, Mass.
Carborundum Co., The, Niagara Falls, New York.
Macklin Co., Jackson, Mich.
Norton Co., Worcester, Mass.

Straight Edges

Ford Motor Co. (C. E. Johansson Div.), Dearborn, Mich.

Straightening and Drawing Machines

—For Bars

Ajax Mfg. Co., The, Cleveland.

Straightening Machines—Bar & Tube

Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Medart Co., The, St. Louis, Mo.
Yoder Co., The, Cleveland, Ohio.

Straightening Machines—Wire

Lewis Machine Co., The, 3455 E. 76th St., Cleveland, Ohio.
Shuster, F. B., Co., The, New Haven, Conn.

Structural Iron and Steel Work

American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Bethlehem (Pa.) Steel Company.
General American Transportation Corp., Chicago, Ill.
Koppers Co., Engineering & Construction Div., Pittsburgh, Pa.
Mahon, R. C., Co., Detroit, Mich.
Morgan Engineering Co., The, Alliance, O.

Swaging Machines

Etna Machine Co., The, Toledo, Ohio.
Torrington (Conn.) Company.

Switches—Electric

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
General Electric Co., Schenectady, New York.
Westinghouse Elec. & Mfg. Co., East Pittsburgh.

Tables—Hydraulic Elevating

Lyon-Raymond Corporation, 137 Madison St., Greene, N. Y.

Tank Lining

Celco Co., The, Cleveland, Ohio.
Manhattan Rubber Mfg. Div. of Raybestos - Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.
National Carbon Co., Inc., Carbon Sales Div., Cleveland, Ohio.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

Tanks—Iron and Steel

Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
General American Transportation Corp., Chicago.
Koppers Co., Bartlett Hayward Div., Baltimore, Md.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.

Tanks—Pickling

Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Havoc Corp., Newark, Delaware.
Manhattan Rubber Mfg. Div. of Raybestos - Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.

Tanks—Rubber Lined

Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Manhattan Rubber Mfg. Div. of Raybestos - Manhattan, Inc., The, 2 Townsend St., Passaic, N. J.

Tantalum Carbide

Vasco-Ramet Corp., North Chicago, Ill.

Tapping Machines

Baugh Machine Tool Co., Springfield, Mass.
Waterbury (Conn.) Farrel Fdry. & Mch. Co.

Taps—Collapsing

Landis Mch. Co., Waynesboro, Pa.
Murphy Machine & Tool Co., Detroit.
National Acme Co., The, Cleveland.

Taps and Dies

Greenfield (Mass.) Tap & Die Corp.
Landis Mch. Co., Waynesboro, Pa.
Morris Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Div. Niles-Bement-Pond Co., West Hartford, Conn.
Victor Machinery Exchange, 251 Centre St., N. Y. C.

Terminals—Plain & Lock

Shakeproof Lock Washer Co., 2525 N. Keeler Ave., Chicago.
Thompson-Bremer & Co., 1640 W. Hubbard St., Chicago.

Testing Machines—Hardness

Shore Instrument & Mfg. Co., Inc., The, Jamaica, L. I., N. Y.

Testing Machines—Materials

Baldwin-Southwark Div. Baldwin Locomotive Wks., Philadelphia.

Thermometers

Brown Instrument Co., The, Philadelphia, Pa.
Leeds & Northrup Co., 4956 Stanton Ave., Philadelphia.

Thread Cutting Tools—See Dies, Taps

Thread Rolling Machines

Nilson, A. H., Mach. Co., Bridgeport, Ct.
Waterbury (Ct.) Farrel Fdry. & Mch. Co., The.

Threading Machines

Eastern Machine Screw Corp., New Haven, Conn.
Landis Mch. Co., Waynesboro, Pa.
Murphy Machine & Tool Co., Detroit.

Threads—Ground

Harford (Conn.) Special Machinery Co., The.
Precision Thread Grinding Co., Detroit, Mich.

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Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Jones & Laughlin Steel Corp., Pittsburgh.

Tin & Terne Plate

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Jones & Laughlin Steel Corp., Pittsburgh.

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Weirton (W. Va.) Steel Co.

Wheeling (W. Va.) Steel Corp.
Youngstown (Ohio) Sheet & Tube Co., The.

Tin Plate Machinery

Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Wear Engineering Co., Inc., The, Warren, Ohio.

Tips—Spot Welding

Mallory, P. R., & Co., Inc., Indianapolis, Ind.

PRODUCTS INDEX

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Heppenstall Co., Pittsburgh.

Tool Bit Tips—Hard Carbide
Carboloy Co., Inc., 11153 East 8-Mile Rd., Detroit, Mich.
McKenna Metals Co., Latrobe, Pa.
Vascoloy-Ramet Corp., North Chicago, Ill.

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Carboloy Co., Inc., 11153 East 8-Mile Road, Detroit.
Gairing Tool Co., The, Detroit.
Gisholt Machine Co., Madison, Wisconsin.

Tool Holders
Armstrong Bros. Tool Co., Chicago.
Gairing Tool Co., The, Detroit.
Gisholt Machine Co., Madison, Wisconsin.
Jones & Lamson Machine Co., Springfield, Vt.
Williams, J. H., & Co., Buffalo, N. Y.

Tools—Lathe
Armstrong Bros. Tool Co., Chicago.
Carboloy Co., Inc., 11153 East 8-Mile Road, Detroit.
Gisholt Machine Co., Madison, Wisconsin.
Jones & Lamson Machine Co., Springfield, Vt.

Torches—Brazing, Cutting and Welding
Air Reduction, 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.
Weldit Acetylene Co., Detroit, Mich.

Trailers
Lyon-Raymond Corporation, 137 Madison St., Greene, N. Y.
Yale & Towne Mfg. Co., The, Philadelphia Div., Phila., Pa.

Tramrails—Overhead Systems
Cleveland Tramrail Div. of The Cleveland Crane & Engng. Co., 1115 East 283rd St., Wickliffe, Ohio.
Harnischfeger Corp., 4101 W. National Ave., Milwaukee.

Tramways—Wire Rope
Broderick & Bascom Rope Co., St. Louis, Mo.
Leschen, A. & Sons Rope Co., St. Louis, Mo.
Macwhye Co., Kenosha, Wis.

Transformers—Electric
Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Transmissions—Hydraulic
American Engineering Co., Philadelphia.
Oliger Co., The, 1311 W. Bruce St., Milwaukee.
Sundstrand Machine Tool Co., Rockford, Ill.

Transmissions—Variable Speed
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Continental Machines, Inc., 1311 S. Washington Ave., Minneapolis, Minn.
Link-Belt Co., 2915 West Hunting Park Ave., Phila., Pa.
Reeves Pulley Co., Columbus, Indiana.

Traps—Steam
Crane Co., Chicago, Ill.
Nicholson, W. H., & Co., 165 Oregon St., Wilkes-Barre, Pa.

Treads—Safety

Blaw-Knox Div. of Blaw-Knox Co., Blawnox, Pa.
Borden Metal Products Co., Elizabeth, N. J.
Hendrick Mfg. Co., Carbondale, Pa.
Kerlow Steel Flooring Co., Jersey City, N. J.
Norton Co., Worcester, Mass.

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Ford Chain Block Div., American Chain & Cable Co., Inc., Philadelphia, Pa.

Trucks—Dump, Industrial
Atlas Car & Mfg. Co., The, Cleveland, Ohio.

Trucks—Hand
Standard Pressed Steel Co., Jenkinsburg, Pa.

Trucks—Lift
Atlas Car & Mfg. Co., The, Cleveland, Ohio.
Automatic Transportation Co., 75 W. 87th St., Chicago, Ill.
Baker-Raulang Co., The, 2175 W. 25th St., Cleveland, Ohio.

Lyon-Raymond Corporation, 137 Madison St., Greene, N. Y.
Yale & Towne Mfg. Co., The, Philadelphia Div., Phila., Pa.

Trucks & Tractors—Electric Industrial
Atlas Car & Mfg. Co., The, Cleveland, Ohio.

Automatic Transportation Co., 75 W. 87th St., Chicago, Ill.
Baker-Raulang Co., The, 2175 W. 25th St., Cleveland, Ohio.
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Baker-Raulang Co., The, 2175 W. 25th St., Cleveland, Ohio.

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Monarch Steel Co., Indianapolis, Ind.

Tube Mill Machinery

Aetna-Standard Engineering Co., The, Youngstown, Ohio.
Continental Roll & Steel Foundry Co., East Chicago, Ind.
Taylor-Wilson Mfg. Co., 25 Thomson St., McKees Rocks, Pa.

United Engineering & Fdry. Co., Pittsburgh, Waterbury (Conn.) Farrel Foundry &

Machinery Co., The.

Tube Mill Machinery—Welded

Continental Roll & Steel Foundry Co., East Chicago, Ind.
McKay Machine Co., The, Youngstown, Ohio.

Tubes—Boiler

Jones & Laughlin Steel Corp., Pittsburgh.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Pittsburgh (Pa.) Steel Co.
Steel & Tubes Div. of Republic Steel Corp., Cleveland.

Tubes—Brass, Copper, Bronze, Nickel Silver

American Brass Co., The, Waterbury, Conn.
Benn Supply Co., Jersey City, N. J.
Phosphor Bronze Smelting Co., The, Phila., Pa.
Revere Copper & Brass, Inc., 230 Park Ave., New York City.

Tubes—Heat Exchanger

Steel & Tubes Div. of Republic Steel Corp., Cleveland.

Tubes—High Carbon

Steel & Tubes Div. of Republic Steel Corp., Cleveland.

Tubes—Stainless Steel

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
Frassie, Peter A., & Co., Inc., 17 Grand St., New York City.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Pittsburgh (Pa.) Steel Co.
Ryerson, Jos. T., & Son, Inc., Chicago.

Steel & Tubes Div. of Republic Steel Corp., Cleveland.

Tubing—Aluminum Seamless

Aluminum Co. of America, Pittsburgh.

Tubing—Copper Coated or Tinned Steel

Bundy Tubing Co., Detroit, Mich.

Tubing—Magnesium Alloys

American Magnesium Corp., 1701 Gulf Bldg., Pittsburgh.
Dow Chemical Co., The, 921 Jefferson Ave., Midland, Mich.

Tubing—Monel

Bundy Tubing Co., Detroit, Mich.
International Nickel Co., Inc., 67 Wall St., New York City.

Tubing—Open Seam

Steel & Tubes Div. of Republic Steel Corp., Cleveland.

Tubing—Seamless Steel

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
Benn Supply Co., Jersey City, N. J.
Frassie, Peter A., & Co., Inc., 17 Grand St., New York City.

Jones & Laughlin Steel Corp., Pittsburgh.

National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Ohio Seamless Tube Co., The, Shelby, Ohio.

Pittsburgh (Pa.) Steel Co.

Ryerson, Jos. T., & Son, Inc., Chicago.

Timken Roller Bearing Co., The, Canton, O.

Timken Steel & Tube Div., The Timken Roller Bearing Co., Canton, O.
Youngstown (Ohio) Sheet & Tube Co., The.

Tubing—Square and Rectangular

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See our
Adv.
Page 196,
Mar. 20,
Iron Age

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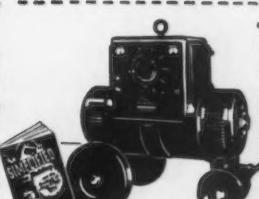
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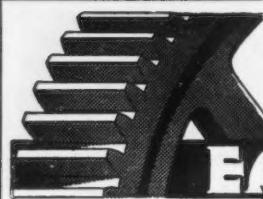
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PRODUCTS INDEX

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Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
Bundy Tubing Co., Detroit, Mich.
Jones & Laughlin Steel Corp., Pittsburgh.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Ohio Seamless Tube Co., The, Shelby, Ohio.
Standard Tube Co., The, Detroit, Mich.
Steel & Tubes Div. of Republic Steel Corp., Cleveland.
Swan Engineering Co., Inc., Newark, N. J.
Youngstown (Ohio) Sheet & Tube Co., The.

Tubular Products

Bundy Tubing Co., Detroit, Mich.
National Tube Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Steel & Tubes Div. of Republic Steel Corp., Cleveland.
Swan Engineering Co., Inc., Newark, N. J.

Tumbling Barrels—See Barrels— BURNISHING & TUMBLING

Tungsten Carbide
Carboly Co., Inc., 11153 East 8-Mile Road, Detroit.
Firth-Sterling Steel Co., McKeesport, Pa.
Vascoy-Ramet Corp., North Chicago, Ill.

Tungsten Metal & Alloys

Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.
Mallory P. R. & Co., Inc., Indianapolis, Ind.

Turbine-Generators—Steam

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

Turning Machines—Bar & Tube

Medart Co., The, St. Louis, Mo.

Turntables

American Bridge Co. (U. S. Steel Corp. Subsidiary), Pittsburgh.
Atlas Car & Mfg. Co., The, Cleveland, Ohio.
Canton Foundry & Mfg. Co., The, Div. of The Hill Acme Co., 6400 Breakwater Ave., Cleveland, Ohio.
Whiting Corp., Harvey, Ill.

Twist Drills

Cleveland (Ohio) Twist Drill Co., The, Greenfield (Mass.) Tap & Die Corp.
Morse Twist Drill & Mfg. Co., New Bedford, Mass.
Victor Machinery Exchange, 251 Centre St., N. Y. C.

Valves—Air Blast for Presses

Logansport (Ind.) Machine, Inc.

Valves—Air & Hydraulic Control

Brown Instrument Co., The, Philadelphia, Pa.
Crane Co., Chicago, Ill.
Hannifin Mfg. Co., Chicago, Ill.
Logansport (Ind.) Machine, Inc.
Nicholson, W. H., & Co., 165 Oregon St., Wilkes-Barre, Pa.
Tomkins-Johnson Co., The, Jackson, Mich.

Valves—Butterfly

R-S Products Corp., Philadelphia, Pa.

Valves—Carbon

National Carbon Co., Inc., Carbon Sales Div., Cleveland, Ohio.

Valves—Hydraulic

Baldwin-Southwark Div. Baldwin Locomotive Wks., Philadelphia.
Birdsboro (Pa.) Steel Foundry & Machine Co.
Crane Co., Chicago, Ill.
Denison Engineering Co., 108 W. Chestnut St., Columbus, Ohio.
Farquhar, A. B., Co., Ltd., York, Pa.
Olgegear Co., The, 1311 W. Bruce St., Milwaukee, Wis.
Logemann Bros. Co., Milwaukee, Wis.
Watson-Stillman Co., The, 103 Aldene Road, Roselle, N. J.
Wood, R. D., & Co., Philadelphia, Pa.

Valves—Iron, Steel & Brass

Crane Co., Chicago.
Jarecki Mfg. Co., Erie, Pa.
Koppers Co., Bartlett Hayward Div., Baltimore, Md.
North American Mfg. Co., The, Cleveland, Ohio.
Wood, R. D., & Co., Philadelphia, Pa.

Valves—Lead

National Lead Co., 111 Bway., N. Y. C.

Valves—Molded Plastic

Hovec Corp., Newark, Delaware.

Vanadium

Electro Metallurgical Sales Corp., 30 E. 42nd St., N. Y. C.

Vibrators

Milwaukee (Wis.) Foundry Equipment Co.

Vises

Cincinnati (Ohio) Milling Mch. Co., The.

Jarecki Mfg. Co., Erie, Pa.

North Bros. Mfg. Co., Philadelphia, Pa.

Vises—Machine

Hendey Machine Co., Torrington, Conn.

Washers—Iron or Steel

Nicetown Plate Washer Co., Inc., Philadelphia.
Sessions, J. H., & Son, Hooker Court, Bristol, Conn.
Shakeproof Lock Washer Co., 2525 N. Keeler Ave., Chicago.
Smith, Thomas, Co., Worcester, Mass.
Thompson-Bremer & Co., 1640 W. Hubbard St., Chicago, Ill.

Washers—Leather

Chicago (Ill.) Rawhide Mfg. Co., The, 1306 Elston Ave.
Garlock Packing Co., The, Palmyra, New York.

Washers—Lock

Shakeproof Lock Washer Co., 2525 N. Keeler Ave., Chicago.
Thompson-Bremer & Co., 1640 N. Hubbard St., Chicago.

Washers—Spring

Detroit (Mich.) Stamping Co.
Hubbard, M. D., Spring Co., 329 Central Ave., Pontiac, Mich.
Shakeproof Lock Washer Co., 2525 N. Keeler Ave., Chicago.
Thompson-Bremer & Co., 1640 W. Hubbard St., Chicago, Ill.

Washing Machines—Industrial

Mahon, R. C., Co., Detroit, Mich.

Washroom Fountains

Bradley Washfountain Co., Milwaukee, Wis.

Welded Steel Machine Frames

Kirk & Blum Mfg. Co., The, Cincinnati, Ohio.
Lundfield Welding Co., Cleveland, Ohio.
Mahon, R. C., Co., Detroit, Mich.

Welder Control—For Spot, Butt & Projection Welding Machines

Electric Controller & Mfg. Co., The, Cleveland.

Welding

Heintz Mfg. Co., Philadelphia, Pa.
Morrison Metalweld Process, Inc., 1436 Bailey Ave., Buffalo, N. Y.
Una Welding, Inc., Cleveland, Ohio.

Welding Contactors

Clark Controller Co., The, Cleveland.

Welding and Cutting Machines and Equipment—Oxy-Acetylene

Air Reduction, 60 East 42nd St., N. Y. C.
Linde Air Products Company, The, 30 East 42nd St., N. Y. C.
Weldit Acetylene Co., Detroit, Mich.

Welding Fixtures

Harnischfeger Corp., 4401 W. National Ave., Milwaukee.

Welding Machines—Electric Arc

Allis-Chalmers Mfg. Co., Milwaukee, Wis.

General Electric Co., Schenectady, N. Y.

Harnischfeger Corp., 4401 W. National Ave., Milwaukee, Wis.

Hobart Bros. Co., Troy, Ohio.

Lincoln Electric Co., The, Cleveland.

Una Welding, Inc., Cleveland, Ohio.

Westinghouse Elec. & Mfg. Co., East Pgh.

Welding Machines—Resistance

Federal Machine & Welder Co., Warren, Ohio.

Swift Electric Welder Co., Detroit, Mich.

Welding Positioner

Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Cullen-Friestdoff Co., 1303 S. Kilbourn Ave., Chicago, Ill.

Ransome Concrete Machinery Co., Dunellen, N. J.

United Engineering & Foundry Co., Pittsburgh.

Welding Rods or Wire

Air Reduction, 60 East 42nd St., N. Y. C.

American Brass Co., The, Waterbury, Conn.

American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Cleveland.

Acros Corp., Philadelphia, Pa.

Bethlehem (Pa.) Steel Co.

Coast Metals, Inc., Canton, Ohio.

Crucible Steel Co. of America, Chrysler Bldg., New York City.

Harnischfeger Corp., 4401 W. National Ave., Milwaukee.

Jones & Laughlin Steel Corp., Pittsburgh.

Lincoln Electric Co., The, Cleveland.

Linde Air Products Company, The, 30 East 42nd St., N. Y. C.

Maurath, Inc., 7400 Union Ave., Cleveland.

Page Steel & Wire Div. American Chain & Cable Co., Inc., Monessen, Pa.

Pittsburgh (Pa.) Steel Co.

Revere Copper & Brass, Inc., 230 Park Ave., New York City.

PRODUCTS INDEX

Roeblings, John A., Sons Co., Trenton, N. J.
Seneca Wire & Mfg. Co., The, Fostoria, Ohio.
Titan Metal Mfg. Co., Bellefonte, Pa.
Una Welding, Inc., Cleveland, Ohio.
Wall-Colmonoy Corp., Detroit, Mich.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Spencer Steel Co., 500 Fifth Ave., N. Y. C.
Youngstown (Ohio) Sheet & Tube Co., The.

Wheels—Car & Locomotive

Carnegie-Illinois Steel Corp. (U. S. Steel Corp. Subsidiary), Pittsburgh & Chicago.
Lobdell Car Wheel Co., Wilmington, Del.
Standard Steel Wks. Div. The Baldwin Locomotive Works, Phila., Pa.

Wheels—Seam Welding

Mallory, P. R., & Co., Inc., Indianapolis, Ind.

Winches—Electric, Gasoline & Diesel

Silent Holst Winch & Crane Co., 851-63rd St., Brooklyn, N. Y.

Wire—Aluminum

Aluminum Co. of America, Pittsburgh.

Wire—Barb

Republic Steel Corp., Cleveland, Ohio.
Wickwire Brothers, Inc., Cortland, N. Y.

Wire—Brass, Bronze, Copper, Nickel Silver or Phosphor Bronze

American Brass Co., The, Waterbury, Conn.
Phosphor Bronze Smelting Co., The, Philadelphia, Pa.
Revere Copper & Brass, Inc., 230 Park Ave., New York City.

Wire—Flat, Round, Square or Special Shapes

American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Cleveland.
Continental Steel Corp., Kokomo, Ind.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Laclede Steel Co., St. Louis, Mo.
Page Steel & Wire Div. American Chain & Cable Co., Inc., Monessen, Pa.
Pittsburgh (Pa.) Steel Co.
Rathbone, A. B. & J., Palmer, Mass.
Roeblings, John A., Sons Co., Trenton, N. J.
Seneca Wire & Mfg. Co., The, Fostoria, Ohio.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Spencer Steel Co., 500 Fifth Ave., N. Y. C.

Wire—High Carbon

American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Cleveland.
Jones & Laughlin Steel Corp., Pittsburgh.
Page Steel & Wire Div. American Chain & Cable Co., Inc., Monessen, Pa.
Republic Steel Corp., Cleveland, Ohio.

Wire—Insulated

American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Cleveland.
General Electric Co., Schenectady, N. Y.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Roeblings, John A., Sons Co., Trenton, N. J.

Wire—Music

Johnson Steel & Wire Co., Inc., Worcester, Mass.
Webb Wire Works, New Brunswick, N. J.
Wickwire Spencer Steel Co., 500 Fifth Ave., N. Y. C.

Wire—Spring

American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Cleveland.
Barnes, Wallace Co., Div. of Associated Spring Corp., Bristol, Conn.
Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.
Johnson Steel & Wire Co., Inc., Worcester, Mass.
Jones & Laughlin Steel Corp., Pittsburgh.

Pittsburgh (Pa.) Steel Co.

Roeblings, John A., Sons Co., Trenton, N. J.
Seneca Wire & Mfg. Co., The, Fostoria, Ohio.

Wire—Stainless Steel

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
Page Steel & Wire Div. American Chain & Cable Co., Inc., Monessen, Pa.
Pittsburgh (Pa.) Steel Co.
Webb Wire Works, New Brunswick, N. J.

Wire—Zinc

Platt Bros. & Co., The, Waterbury, Conn.

Wire Cloth

Buffalo (N. Y.) Wire Wks. Co., Inc.
Ludlow-Saylor Wire Co., St. Louis, Mo.
Roeblings, John A., Sons Co., Trenton, N. J.
Wickwire Brothers, Inc., Cortland, N. Y.
Wickwire Spencer Steel Co., 500 Fifth Ave., N. Y. C.

Wire Drawing, Straightening & Cutting Machinery

Ajax Mfg. Co., The, Cleveland.

Wire Forming Machinery

Ajax Mfg. Co., The, Cleveland.

Baird Mch. Co., The, Bridgeport, Conn.

Nilson, A. H., Mach. Co., Bridgeport, Ct.

Torrington (Conn.) Mfg. Co., The.

Wire Forms, Shapes and Specialties

Accurate Spring Mfg. Co., 3819 W. Lake St., Chicago, Ill.

American Spring & Mfg. Corp., Holly, Mich.

American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Cleveland.

Barnes-Gibson-Raymond, Detroit Plant Div. of Associated Spring Corp.

Barnes, Wallace, Co., Div. of Associated Spring Corp., Bristol, Conn.

Buffalo (N. Y.) Wire Wks. Co., Inc.

Cuyahoga Spring Co., The, Cleveland.

Dunbar Bros. Co., Div. of Associated Spring Corp., Bristol, Conn.

Eastern Tool & Mfg. Co., Bloomfield, N. J.

Hindley Mfg. Co., Valley Falls, R. I.

Hubbard, M. D., Spring Co., 329 Central Ave., Pontiac, Mich.

Jones & Laughlin Steel Corp., Pittsburgh.

Lee Spring Co., Inc., 30 Main St., Brooklyn, N. Y.

Ludlow-Saylor Wire Co., St. Louis, Mo.

Raymond Mfg. Co., Div. of Associated Spring Corp., Corry, Pa.

Roeblings, John A., Sons Co., Trenton, N. J.

U. S. Steel Wire Spring Co., Cleveland, O.

Wickwire Brothers, Inc., Cortland, N. Y.

Wickwire Spencer Steel Co., 500 Fifth Ave., N. Y. C.

Wire Mill Machinery and Equipment

Lewis Machine Co., The, 3455 E. 76th St., Cleveland, Ohio.

McKay Machine Co., The, Youngstown, Ohio.

Morgan Construction Co., Worcester, Mass.

Shuster, F. B., Co., The, New Haven, Conn.

Vaughn Machinery Co., The, Cuyahoga Falls, Ohio.

Waterbury (Ct.) Farrel Fdry. & Mach. Co., The.

Wire Rope

American Steel & Wire Co. (U. S. Steel Corp. Subsidiary), Cleveland.

Bethlehem (Pa.) Steel Company Broderick & Bascom Rope Co., St. Louis, Mo.

Columbia Steel Co. (U. S. Steel Corp. Subsidiary), San Francisco, Calif.

Jones & Laughlin Steel Corp., Pittsburgh.

Leschen, A. & Sons Rope Co., St. Louis, Mo.

Macwhyre Co., Kenosha, Wis.

Roeblings, John A., Sons Co., Trenton, N. J.

Wickwire Spencer Steel Co., 500 Fifth Ave., N. Y. C.

Wire Rope Fittings

Macwhyre Co., Kenosha, Wis.

Roeblings, John A., Sons Co., Trenton, N. J.

Wire Straightening and Cutting Machinery—Automatic

Lewis Machine Co., The, 3455 E. 76th St., Cleveland, Ohio.

Shuster, F. B., Co., The, New Haven, Ct.

Wrenches

Armstrong Bros. Tool Co., Chicago.

Williams, J. H., & Co., Buffalo, N. Y.

Wrenches—Pipe

Greenfield (Mass.) Tap & Die Corp.

Ushio Mfg. Co., Inc., 135 Tonawanda St., Buffalo, N. Y.

Wrenches—Tap

North Bros. Mfg. Co., Philadelphia, Pa.

Zinc—Strip

Platt Bros. & Co., The, Waterbury, Conn.

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2"x2"x14" Bertsch Angle Bending Roll, B.D.

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5" Bar P & H Boring & Drilling Machine, Arr. for M.D. Work Table 8'x1'. No. 6 Morse Taper

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No. 3 LaPointe Broaching Machine, Cap. 15"

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75"x247' Steel Building, Heavy Construction

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No. 7 Ajax, M.D., Face of Crosshead 12"x76", 16" Stroke
No. 8 Williams & White, M.D., Face of Crosshead 20½" x 108" x 24" Stroke

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No. 1 Cadwell Vertical Capstan Car Spotter, M.D.

CRANES—OVERHEAD ELECTRIC TRAVELING

3 ton P & H	40'	Span 220 Volt D.C.
7½ ton Bedford	67½"	Span 220/3/60 A.C.
10 ton Alliance	32¾"	Span 220/3/60 A.C.
10 ton Toledo	32¾"	Span 220/3/60 A.C.
15 ton Niles	48'11½"	Span 220/3/60 A.C. Including Phase Changer
15 ton Niles	50'	Span 230 Volt D.C.
25 ton Niles	30'	Span 230 Volt D.C.
25 ton Maris	45'	Span Hand Operated
25 ton Shaw	70'	Span 230 Volt D.C.
50 ton Niles	30'6"	Span 220/3/60 A.C.
		5-ton Auxiliary

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25,000 lb. Draw Bench, Arr. for Belted M.D. Bed 35' long, Equipped with Aetna Pusher and Hydraulic Equipment for operation

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4" Plain Radial Drill, 12" dia. column

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½" McCabe Pneumatic Flanging Machine

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¾" to 7" Ajax, National, Acme, Steel Frame

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145 KW Continuous Electric Strip Annealing Furnace, Capacity 600-1050 lbs. per hour. Heating Chamber 30"x15"x12'
2,000 lb. Electric Furnace Co. Annealing Furnace. Inside chambers 45" wide. Recuperative chamber inside length 13'2¾", Heating chamber inside length 9'4"

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3 ton Pittsburgh Electric Steel Melting Furnace. Complete with transformer equipment, 11,000 Volt, 25 cycle

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800 H.P. Falk Double Reduction Gear Drive
1000 H.P. Falk Double Reduction Gear Drive
1200 H.P. Falk Double Reduction Gear Drive

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312 KVA Westinghouse 2300/3/60 volt Generator with direct connected Corliss Engine 18"x30"
400 KW Crocker-Wheeler 250 Volt Generator with direct connected Mesta Uniflow Auto. Steam Engine 26"x30"
500 KW General Electric Generator, 2300 volt, 3 phase, 60 cycle with 665 H.P. McIntosh-Seymour Diesel Engine
1250 KVA General Electric Generator, 2300 Volt, 3 phase, 60 cycle with 1000 KW General Electric Turbines
3000 KW General Electric Generator, 5000 Volt A.C. with 3000 KW Curtis Steam Turbine
4000 KW General Electric 4500/3/60 volt Generator with direct connected General Electric Steam Turbine

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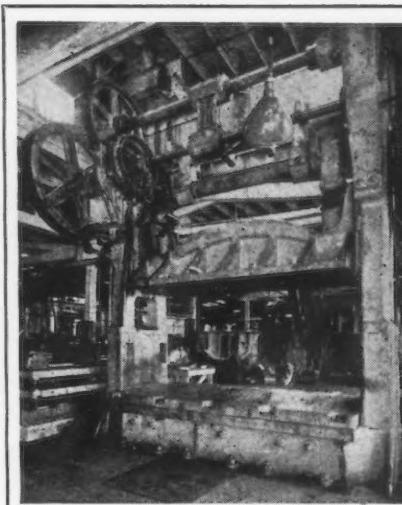
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Hilles & Jones Plate Jogging Machine, cap. ¾" plates 42" from edge or 1" plate 12" from edge. Arr. for M.D.

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42"x28' Wicker Heavy Duty Screw Cutting Engine Lathe, M.D.



NO. 96F TOLEDO DOUBLE CRANK PRESS

Tie Rod Construction
124" Between Uprights
12" Stroke
Complete with 40 H.P. Motor

**30,000 LB. RIEHLE BROS.
UNIVERSAL TESTING MACHINE
MOTOR DRIVE**

**8000 LB. MORGAN
STEAM FORGING HAMMER**
Double Leg

**100" WILLIAMS WHITE DOUBLE CRANK
PLATE SHEAR & MULTIPLE PUNCH**
Motor driven with electrical equipment

**134" CLEVELAND NO. 6 DOUBLE CRANK
PLATE SHEAR & MULTIPLE PUNCH**
Motor driven with electrical equipment
12" Shaft

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50" McKay Roller Leveller, 17 Rolls, 4½" dia.
M.D.
75" Torrington Roller Leveller, 19 Rolls, 2" dia.
Arr. for M.D.

MILLING MACHINE—PLANER TYPE

42"x42"x16' Ingersoll Single Face Adj. Rail Planer Type, Bell Driven

MILLING AND SHAVING MACHINE

Newton L-91 Milling and Shaving Machine, 1 vertical spindle, 4 horizontal spindles, Table Drive, Hyd. center feed. Width between horizontal cutters 21". Face of vertical spindle 10"

MOTOR GENERATOR SETS

45KW G.E. 60 volt DC Generator, with 70 HP 220/3/60 Motor
70 KW Burke 220 volt DC Generator with 125 HP 440/3/60 Motor
280 KW Allis-Chalmers 2300 volt AC Generator with 460 HP Allis-Chalmers 230 volt DC Motor

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4" Landis, motor driven, complete with cutting off attachment and chamfering attachment
8" Standard Engineering Company Pipe Threading and Cutting Machine, Arr. for M.D.
8" Easton, Cole and Burnham Pipe Threading Machine, Motor Driven
16" Williams Pipe Threading Machine, Motor Driven

PLANERS—ROTARY

Newton Type T-22-A Column Facing Machine, 31½" cutter head
Espe-Lucas No. 1 Column Facing Machine, 30" cutter head

PRESSES—HYDRAULIC

1200 ton Dunning & Boschert Hyd. Press, 28" ram, Steam heated platen
3000 ton Southwick Forging Press, 3 Column, 17" dia., 7" Between Columns, 15" Stroke
30° Daylight

PRESSES—DOUBLE ACTING—TOGGLE

No. 162 Toledo 5" stroke of Blankholder, 8½" stroke of plunger, 21"x21" bed area
No. 408-A Bliss Double Crank, 15" stroke, 72"x50" bed area

PRESSES — SINGLE ACTING — STRAIGHT SIDE

No. 166½ Consolidated 6" stroke, 47" between uprights
No. 6 Bliss Double Crank Pres, 6" Stroke, 96" bet. uprights, Bed area 33"x86"

PRESSES—MISCELLANEOUS

1 D-45 Ferracute Press, Horizontal Double end Screw type, 36" ram stroke
No. 6 Bliss Horizontal Reducing Press, Belt Drive, 8" stroke
No. 6½ Bliss Reducing Press, 21" between uprights
No. 856 Toledo Rack & Pinion Press, stroke of ram 5" to 36", Bed area 22"x22"

PUNCH—HORIZONTAL

22 Hilles & Jones, Arr. M.D. Cap. punch 1" thru 1"

PUNCH & SHEAR COMBINATIONS

No. 6 Whiting Single End, B.D. 15" throat, capacity punch ¾" thru ¾"
No. 14½ Williams & White, Arr. M.D. 36" throat, Cap. punch 1" thru 1"
Style G Cleveland Single End, Arr. M.D. 14" throat, Cap. punch 2" thru 1"

ROLLING MILLS

9"x18" Farrel Rod Rolling Mill, 3 High
10"x16" United E & F Co. Single Stand Two High
12"x15" Mackintosh Single Stand Two High
16"x10" Waterbury Four Stand 2 High
16"x20" Waterbury Farrel Single Stand Two High
16½"x22" Cold Strip Mill 2 Stand 2 High
16" Garrison Bar Mill, 2 Stands 3 High 1 Stand 2 High
21" Mackintosh Bar Mill, 2 Stands 3 High

SAW

50" Mackintosh Hemphill Tilting Frame Hot Saw M.D. Cap. 8 x 8 blooms

SHEARS—ANGLE

4x4x½" Long & Allstatter Double Angle Shear, Arr. M.D.
6x6x¾" Pels Type GF30 Double Angle Shear, B.D.

SHEARS—BAR

Pels Bar Shear, M.D. Capacity 2" square
No. 6 Buffalo Armor Plate Bar Shear, Arr. for B.D. Cap. 1 5/16" square, 1 ½" round

SHARPENING—GATE

96"x1¼" Morgan Eng. Co. plate Cutting Off Shear, Arr. for M.D. 7½" stroke

SHARPENING—ROTARY

Newbold Rotary Shear, Arr. for M.D. Cap. ½" mild steel plates. Complete with circle cutting attachment

SHARPENERS—SQUARING

36" Stoll Power Squaring Shear, B.D. Cap. 16" 60" Eq. with hold-down and gauges
No. 396 Niagara 8' Squaring Shear, M.D. Equipped with hold-down and gauges. No. 10 gauge capacity

SLITTERS

5" Bliss Gang Slitter, No. 213—M.D. Cap. 36 cuts 22ga. to 5' cuts 212ga.
6" Bliss Gang Slitter, No. 213-E Arr. for M.D. Cap. 7 cuts 214 ga. mild steel

STRAIGHTENERS

¾" Shuster Automatic Wire Straightening Machine, arr. for M.D. 14' cut-off
Shuster Shape Straightening Machine, M.D. Cap. 1" hex.
No. 0 Medart Straightener, Arr. for M.D. Cap. ¾"x1½" dia. inclusive, any length
No. 3 Sutton Two Way Flat & Shape Straightener, Arr. for M.D. Cap. 1 1/16"x11/16" or 1 ¼"x13/16" Flats, etc.

TESTING MACHINE

50,000# Olsen Four Screw Type Universal Testing Machine, M.D.

WELDING MACHINE

800 KVA "Swift" Slash Welder with two transformers

Manufacturing

RITTERBUSH & COMPANY, INC.
30 CHURCH ST.
NEW YORK CITY

Equipment

Confidential Certified Appraisals

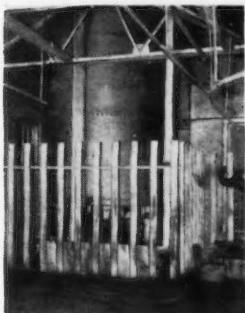
Liquidations—Bona Fide Auction Sales Arranged

Consulting Engineering Service

Surplus Mfg. Equipment Inventories Purchased

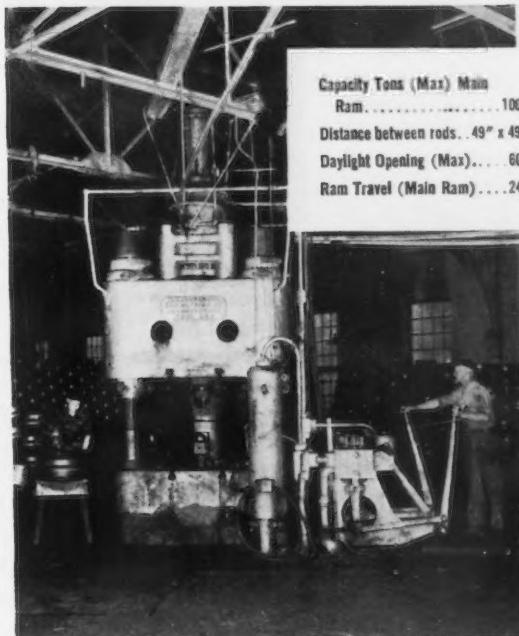
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Available Immediately 1000 TON HYDRAULIC PRESS



Press complete with complete operating system including accumulator and ballast, intensifier, 125 H. P. Horizontal Type pump, motor, electrical control and all hydraulic operating valves and piping. This equipment is in excellent condition and may be seen in operation. For complete specifications and price, wire . . .

The Hydraulic Press Mfg. Co., Mount Gilead, Ohio



Capacity Tons (Max) Main Ram 1000
Distance between rods. 49" x 49"
Daylight Opening (Max) 60"
Ram Travel (Main Ram) 24"

HUNDREDS OF TOOLS IN STOCK

BORING MILL—Lucas 2 1/4" Bar, Horiz.
BORING MILL—Baush & Harris, 37"—2 Head
BRAKE—Rafter, 10 1/4" All Steel, M.D.
CHUCKING MACHINES—Potter & Johnston
DRILL—Prentice 6" Radial
GEAR GENERATOR—Lees-Bradner No. 5A
GEAR HOBBER—G&E No. 36-HS
GRINDERS—Norton, 6x32, 10x36, 10x50
GRINDER—Excell No. 112-A (Boring Machine)
GRINDER—Landis, 12"x66" Universal
GRINDERS—Landis No. 25—12"x96" Plain
HAMMERS—Chambersburg 1500 lb. Steam Drop
HAMMER—Standard 800 lb. Automatic Drop
HAMMER—Hi-Speed No. 5A
HOBBER—Barber-Colman Soline
LATHE—Hendey 12"x6", 14"x6", 14"x12"—Y.H.
LATHES—16"x6", 18"x8", Prentice, G.H.
LATHES—Lo-Swing, 4x36, 4x60, 4x108
LATHES—American 27"x16", 12 Speed, G.H., M.D.
LATHES—Pittsburgh 32"x24" QCG
LATHE—Fifield 44"x27" (with risers for 66")
MILLER—Lees-Bradner, 23-B, Internal
MILLER—Niles, 36" Slab, Table 33"x72"
PLANER—Pond 30"x30"x10'
PRESSES—Bliss, Nos. 16 & 39 Horning
ROLLING MILL—12"x12" Steel
SCREW MACHINES—Hand—Most makes & sizes
SHEAR—Niagara No. 410 Circle & Slitting
SLOTTER—Bement Miles, 18" Stroke
SPRING COILER—Baird
TAPPFR—Anderson No. 40
TESTER—Rieble 50,000 lb.
WIRE STRAIGHTENERS—Many Sizes

"America's Leading Machinery
Rebuilders"

BOTWINIK BROTHERS, INC.
343 Welton St., New Haven, Conn.

AUTOMATICS

- 2—#52 NATIONAL ACME, 4-spindle, belt drive 3/4" capacity.
- 2—#53 NATIONAL ACME, 4-spindle, belt drive, 1" capacity.
- 1—3 1/4" CLEVELAND, single spindle, model "A".

All of these Automatics in good condition and can be seen in operation on foundations.

THE O'BRIEN MACHINERY CO.
OFFICE: 113 NORTH THIRD STREET
PHILADELPHIA, PA.

ATAUCTION MACHINE TOOLS

EXCESS EQUIPMENT OF
THE OLIN GAS ENGINE CO.
10-16 LOCK ST., BUFFALO, N. Y.
TUESDAY, OCTOBER 7, 1941
AT 10 A.M. STANDARD TIME

ON THE PREMISES

NOTE: The Olin Gas Engine Co. is continuing in business. The company has ceased the manufacture of engines only.

Lucas Horizontal Boring Mill: 2 1/4" Bar, 24" Power Travel.

Grinders: Heald Ring, 2 No. 60 Heald Internal, No. 6 Bryant Internal, 2 Norton 6" 32" Plain Cylindrical, Norton 10 x 50" Plain Cylindrical, Bath Universal.

Lathes: Putnam 20" x 6", American 18" x 9" Q. C. G., Adams Short Cut, Prentice 16" x 6' L. C. G., Hamilton 18" x 9" Q. C. G., Davis 16" x 6' L. C. G., Porter 16" x 8' L. C. G.

Planers: Cincinnati 36" x 36" x 14', Pease 24" x 24" x 6".

Drills: Morris Radial, Carlton Sensitive Radial, Prentice 20" Upright, Foote-Burt S. S. Upright, 8-spindle Multiple Drill Head, G. Barr & Co. Upright Sensitive, Bench Drill, Osgood Sensitive Drill Press.

Milling Machines: No. 2 Kempsmith Plain Miller.

Miscellaneous: Davis Keyseater, Hack Saw, McQuay-Norris Score Filing Machine, Niagara Initial Type Bending Roll and Bending Brake, Floor Type Kick Press, Pipe Cutting and Threading Machine, Double End Grinders, Saw Table, Punch Press—etc.

Inspection Monday, October 6, 1941,
9 A. M. to 4 P. M.

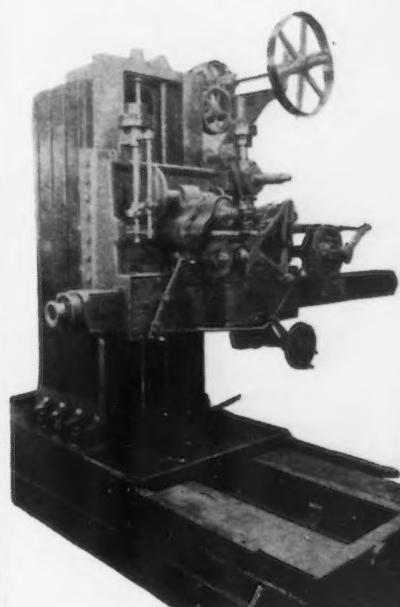
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MORTON TRAVELING HEAD PLANER

One of our many items



Size of bar 7 1/2" square.
Length of bar 10'.
Travel of bar on column. 3' 6" vertically.
Length of base 126".
Width of base 40".
Travel of column on base 80".
Planed side 22" wide x 67" high.

Louis E. Emerman & Co.
1761 Elston Ave. Chicago, Ill.

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ENGINEERED REBUILDING for DEFENSE

- Having machine tool trouble? Trying to fit out-dated equipment to today's high-speed production requirements?
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- Send your machines to Simmons for Engineered Rebuilding!
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FOR QUICK DELIVERY

LATHES

30"x28' N.B.P. G.H. Boring and Turning, M.D.
32"x21' N.B.P. Heavy Duty Forge Lathes for Turning, M.D.
20' Swing GLEASON Pit Lathe.

SAWS

24" NEWTON Cold Saw, 7½" Cap.
32" NEWTON No. 204, 9½" Cap.
42" NEWTON No. 574, 12½" Cap.
60" ESPEN LUCAS, 20" Cap.
52" RYERSON, Friction, 24" Cap.
No. 2 GARBO Metal Saw Table.

*"A USED Tool
That Is Rebuilt
Has UNUSED
Working Hours"*

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MACHINE TOOL CORP.

NORTH BROADWAY, ALBANY, N.Y.
NEW YORK OFFICE: 149 BROADWAY

MOREY

Dependable Used Machines

BEAMAN & SMITH 4" Bar Floor Type Horiz. Boring Mill

LODGE & SHIPLEY 18" x 12', selective geared head Lathe

ELYRIA, 42" x 38' Heavy Duty Lathe

LEBLOND 25" x 16' Cone Pulley Lathe

McCABE 24 x 42" x 14' Double Spindle Lathe

WHITCOMB-BLAISDELL 22x12' 8 speed geared head Lathe

FOSTER No. 1F Fastermatic Turret Lathe

NATCO 13H Hydraulic Multiple Spindle Drill

BAKER #310 Mfg. Drill

BARNES 22", 4 spindle all geared Drill

WESTERN 6' and 7' Plain Radial Drills

GLEASON 37" Bevel Gear Planer

GLEASON 6"-11" Bevel Gear Generators

B. & S. No. 13 Spur and Bevel Gear Cutter

G. & E. No. 18H Gear Hobber

LANDIS 3½" Internal Hydraulic Race Grinder

HEALD No. 55 Internal Grinder

B. & S. No. 3 Universal Grinder

NORTON 6 x 32 Plain Grinder

INGERSOLL 24" x 24" x 12' Slab Miller

P & W 8" Auto. Miller

P & W 12" x 48" Thread Miller

LEES BRADNER No. 3 Thread Miller

CINCINNATI 18" Auto. Duplex Miller

BLISS No. 73½" Straight Side Press

BLISS No. 160 Single Stroke Crank Press

CLEVELAND 3/8", 1/2", 5/8", 7/8", 11/4"

21/4", 23/4" Model "A" Auto. Screw Machines

WAGNER Hydraulic Cold Saw—Cap. 7"

ESPEN LUCAS No. 138 Cold Saw—Cap. 12" Rd.

NEWTON No. 200 Cold Saw—Cap. 11" Rd.

CLEVELAND No. 1 Plate Planer

AMERICAN 36" x 36" x 20' Planer—4 heads

ACME 1" All Steel Upsetter

AJAX 3" All Steel Upsetter

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MACHINERY CO., INC.
410 Broome St., New York

LATE PURCHASES

MILLING MACHINES

No. 14A Garvin plain.
No. 4 Ohio plain.
Nos. 1 & 1½ Knight vertical.
No. 5 Brown & Sharpe vertical.
Nos. AB & 3 Becker vertical.

BORING MILLS

5" No. 2 Barrett cylinder.
24" Bullard, side head.
30" Bullard, single turret.
36" Niles car wheel.
42" Niles Bement Pond.
60" Bullard.

MISCELLANEOUS MILLERS

12" Cincinnati Mfg.
30" Model C Becker cont. rotary.
48" Ohio tilted offset.
48" Newton cont. rotary.
60" Ingersoll cont. rotary.
Nos. 1 & 1A Davis & Thompson drum.
Type 45 Bilton Productomatic.
Nos. 3 & 3E Lees Bradner thread.
Superior & Kent Owens hand.
No. 7 Burr slab or keyseat miller.
No. 2M Potter & Johnston auto.
No. 3 Van Norman duplex.
48"x20"x20' Ingersoll planer type slab miller.
24"x20"x20' Ingersoll planer type slab miller.

SHAPERS

7" Rhodes.
14" American.
16" Walcott.
20" Smith & Mills.
22" Ohio.
24" Rockford.
24" Cincinnati.
24"x24"x24" Cincinnati planer, shaper.
36" & 48" Morton draw-cut.

SHEET METAL TOOLS

10'x10 ga. No. 410B, D&K, Chicago steel press brake.
1½"x12" Lewis wire cutter & stnr.
Nos. 1 and 2M Pettingell bumping hammers.
¾"x3" Shuster wire straightener & cutter.
¾"x5" Shuster wire straightener & cutter.
No. 1 Gray Sheet Metal Cutter 3/16"x34" throat.
No. 16M Marshalltown rot. shear.
No. 3 RH. Magee wiring machine.
No. 575 Hawes rod & tube polisher.
No. 3 Robinson OBI press.
No. P2 Ferracute 1" stroke press.
150-ton Elmes hyd. press.
No. 54 Hendley & Whittemore comb. shear, punch & rod cutter.
No. 1½ Long & Alstatter punch.
Nos. 1½B, 2A, 3A, 4A & 7B High Speed riveters.
72"x14 ga. Stameo power square shear.
Layout tables, various sizes.
Young Bros. 2 compartment japping oven.
Blakeslee metal parts washers.

WELDERS

12 KVA A.E.F. spot.
17 KVA Thompson Gibb spot.
18 KVA A.E.F. spot, air oper.
20 KVA Agnew spot.
20 KVA Taylor spot.
20 KW National spot.
20 KW Federal spot.
20 KW Taylor Moesta portable.
23 KVA Winfield spot.
100 KVA Thompson Gibb projec. spot.
25 KW Winfield butt.
35 KW No. 60 Federal butt.
65 KW Federal butt.
75 KW No. 61 Federal flash butt.
150 KVA No. 35 Swift flash butt.

MISCELLANEOUS

2" x 4½" Cleveland automatics.
6" 14" American radial drill.
No. 3 Landis 16"x42" univ. grinder.
14" Pratt & Whitney surface grinder.
No. 2 Schuchardt & Schuette hob grinder.
No. 3 Barber Colman hob grinder.
Nos. 50, 60 & 75 Heald int. grinders.

We are interested in purchasing good surplus tools, please send us your lists.

MILES MACHINERY CO.
Saginaw, Mich.

THE CLEARING HOUSE

UPSETTERS

Ajax— $2\frac{1}{2}$ "— 3 "— 5 " Susp. heading slides
National— 3 "— 5 " guided overarm heading slides
Older style box type slide machines— $\frac{3}{4}$ " to 5 "

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400 $\frac{1}{2}$ —1500 $\frac{1}{2}$ B. & S. Board Drop
1500 $\frac{1}{2}$ Erie Steam Drop
2—1000 $\frac{1}{2}$ Chambersburg Steam Drop
1500 $\frac{1}{2}$ Erie Dbl. Frame Steam Forge
1500 $\frac{1}{2}$ N.P. Sgl. Frame Steam Forge
4000 $\frac{1}{2}$ Chambersburg Dbl. Frame Steam Forge
3000 $\frac{1}{2}$ Chambersburg Dbl. Frame Steam Forge
4000 $\frac{1}{2}$ N.P. Sgl. Frame Steam Forge
150-ton Davy Steam Forge
Bradley Hammers—all sizes and types up to 500 $\frac{1}{2}$

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Bolt, Nut and Rivet machinery for both cold and hot manufacture
Threading machines—all sizes
Complete Wood Screw Equipment

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24 H. & J. Horiz. Punch & Bender
24 H. & J. 22' Plate Planer
Single and Double-end Punches
National 50 KVA Butt Welder

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6x6x1" L. & A. Dbl. Angle Shear
240 United Engineering Vertical Shear
23 D. & K. High Knife Alligator Shear
10 ft. x $3\frac{1}{16}$ " Geo. Ohi Squaring Shear
Guillotine type shears— $1\frac{1}{2}$ "— $2\frac{1}{2}$ "— $2\frac{1}{2}$ "
Misc. Alligator Shears up to 2" round

BULLDOZERS

W. W. 21—2—3—4—5

MISCELLANEOUS PRESSES

Straight Side, Solid Back, O.B.I., Horning, Trimming, etc.

MISCELLANEOUS

#3 and #4 Marville Ball Headers

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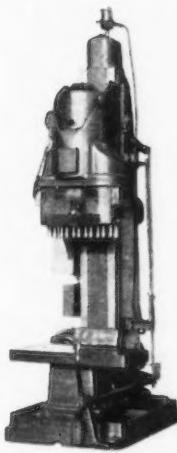
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MULTIPLE DRILLS

One of our many items



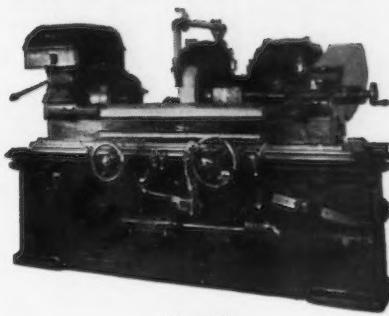
4—No. 920 BARNES MULTIPLE HYDRAULIC DRILLS

16 spindle straight line head.
No. 2 Morse Taper, 1 $\frac{1}{4}$ " O.D.
Center of spindles to column 12".
Travel of head on column 14".
Hydraulic control to head movement.
Type O.S. Oilgear pump.
Base 46" L to R, 41" F to B.
Equipped with 7 $\frac{1}{2}$ H.P. motor on head.

These drills are in excellent condition and are available for immediate delivery.

LOUIS E. EMERMAN & CO.
1761 Elston Ave. Chicago, Ill.

HILL-CLARKE MOTOR DRIVEN GRINDERS



SIZES
IN STOCK:

6 x 32	10 x 72	16 x 72
10 x 18	14 x 36	16 x 120
10 x 24	14 x 50	18 x 96
10 x 36	14 x 72	18—30 GAP x 96
10 x 50	16 x 50	21 x 96

HILL-CLARKE MACHINERY CO.
647 WASHINGTON BLVD.

CHICAGO

IN STOCK

BORING MILL—84" Pond vert belt drive, 2 heads

BORING MILL—42" Bullard vert. m. dr., q. c., 2 heads

DRILL—3' Prentice Plain Radial, m. dr.

GRINDER—12"x36" P & W. Surface, belt

GRINDER—20"x144" Landis Plain, mtzd.

LATHE—54"x16" Johnston, m. dr., 9" centers

LATHE—45"x24" New Haven, belt, pl. change

LATHE—30"x20" LeBlond, motorized, q. c.

LATHE—18"x16" Flather, belt, q. c.

LATHE—18"x10" Lodge & Shipley, belt, q. c., taper.

MILLER—#4 Cincinnati, plain, belt drive, d.b.g., w.s. table 16"x63".

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OFFICE: 113 NORTH THIRD STREET,
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60" x 60" x 30' GRAY PLANER

4 Heads. Reversing Motor Drive

ROSENKRANZ, WEISBECKER & CO., INC.
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36"x36"x12' USED D & H OPENSIDE PLANER.

2 heads, will plane 37" high under the beam.
Square down 38" wide. By angling the beam head, will plane about 50" wide on a straight surface. Motor drive.

54"x54"x20' USED SELLERS PLANER.
With 2 heads on rail. Belt drive.

INGERSOLL USED PLANER TYPE MILLING MACHINE

Adjustable rail, table 30"x10", arbor completely across table.

L. M. GILBERT
516 Drexel Bldg., Philadelphia, Penna.

CINCINNATI No. 4 Universal Milling Machine with vertical attachment.

ROGERS, 60" Vert. Hi-Pd. Boring Mill, 2 Heads, M.D.

V. & O. 250 ton T.R. gap frame power press.

BLISS Nos. 1, $1\frac{1}{2}$, $3\frac{1}{2}$ A, $3\frac{3}{4}$ B & 4 Toggle Presses.

YODER Twenty Stand Roll Former M.D.

OHL 10" 10 ga. Press Brake.

WELLS No. 12 Gang Press, 84" Bed, M.D.

NATIONAL MACHINERY EXCHANGE
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No. 2 Brown & Sharpe
No. 2G Brown & Sharpe
No. 6A Potter & Johnston

BROACHES

No. 3 and No. 4 LaPointe

DRILLS

No. 2 Colburn S.S.
24" Barnes, Power feed
36" Barnes, Power feed
No. 12 Natco Multiple spindle
No. 5 Fox Multiple spindle
Natco 3-way Horizontal multiple spindle

GEAR CUTTERS

15" Gleason Spiral Bevel
18" Gleason Gear Tester

GRINDERS—Cylindrical

No. 20 Bryant Chucking
16"x50" Norton Crankshaft
No. 2 Brown & Sharpe Universal
18x96" Brown & Sharpe Plain
No. 3 Cincinnati Centerless

GRINDERS—Rotary

No. 25 Heald—18" chuck

GRINDERS—Surface

No. 2 Diamond
22x84" Pratt & Whitney

LATHES

8"x 6" Rivett Precision, C.D.
14"x 6" Monarch, C.D.
16"x 6" Monarch, C.D.
20"x16" Monarch, C.D.
21"x 8" LeBlond, C.D.
22"x14" Bradford, G.H.
8"x24" Sundstrand, S.P.D.
3½"x60" Fitchburg Lo-Swing, G.H.
11"x 5" LeBlond, G.H. Production
14"x 6" LeBlond, C.D. Production
18"x 7" Chard, C.D. Production

LATHES—Turret

No. 6 Warner & Swasey, C.D.
No. 2A Warner & Swasey
No. 3A Warner & Swasey
No. 1B Foster
No. 5 Foster
No. 4½ Bardons & Oliver
No. 7 Bardons & Oliver
No. 9 Bardons & Oliver
No. 10 Bardons & Oliver
2½"x24" Jones & Lamson
3"x36" Jones & Lamson
26" Libby

MILLS—Boring

No. 3 Universal—Horizontal
42" Bullard Vertical

MILLS—Plain

No. 2B Brown & Sharpe, S.P.D.
No. 3 Cincinnati, S.P.D.
No. 3S Cincinnati, Rect. Overarm
No. 21 Brown & Sharpe, S.P.D.
18" Cincinnati, S.P.D.

MILLS—Vertical

No. 4B Becker, C.D.
No. 5B Becker, C.D.
No. AB Becker, S.P.D.

OIL GROOVER

Wicaco Continuous

PLANERS

30x30x 8' Cincinnati
60x60x11' Pond

PROFILERS

No. 13 Pratt & Whitney

ROLL FORMING MACHINE

Hamilton—8 stand

SAWS

No. 4 Atkins Band—M.D.
16" Higley Cold Cut
No. 6 Nutter & Barnes

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SUPPLY CO., INC.**
1959 S. Meridian St.
INDIANAPOLIS, INDIANA

REMANUFACTURED —(ORIGINATED BY US)— MACHINE TOOLS

Reg. U. S. Patent Office

Boring Machines

No. 2—3 1/16" Bar Rockford
No. 2—3 1/2" Bar Rockford
No. 1—3 3/4" Bar Barrett, Cross Table
No. 2—4 1/2" Bar Barrett
No. 2—5" Bar Barrett

Boring Mills

30" Bullard

42" Bullard

72" Bleckford

Drills

No. 2—I spdl. Foote-Burt Sipp
1, 2, 4 spdl. Henry & Wright
No. 2—4 spdl. Leland-Gifford, motor spdl.
No. 2—4 & 6 spdl. Leland-Gifford
No. 2 Colburn, 4 spdl.
4 spdl. Moline, Hole Hog
No. 1 Baush Multiple
No. 3 Baush Multiple
3 1/2" Cincinnati-Bickford
6" Niles-Bement-Pond Universal
8" Western Plain Radial

Gear Cutters

No. 2 Barber-Colman Hobber
No. 2 Barber-Colman Hobber
No. 1/2 Pfauter Hobber, M.D.
No. 2—36" Pfauter Hobber
No. 3—26" Brown & Sharpe
No. 4—48" Brown & Sharpe
No. 6—72" Brown & Sharpe
No. 6-A 72" Cincinnati
96" Newton, M.D.
Nos. 6, 61, 62 Fellows
No. 36-BM Gould & Eberhardt

Grinders

No. 70 Heald Internal
No. 60 Heald Cylinder
8" Arter Rotary Surface
No. 2½ Universal (Bath Type)
No. 4—12"x66" Landis Universal
16"x32" Landis Crankshaft
No. 5 Springfield Planer Type Surface
No. 2—18" Gardner Disc

Lathes

3 1/2" 36" Fitchburg Lo-Swing
3 1/2" x 60" Fitchburg Lo-Swing
3 1/2" x 108" Fitchburg Lo-Swing
8"x60" Fitchburg Lo-Swing
18"x6" Bradford Geared Head
18"x8" Lodge & Shipley
21"x10" LeBlond
20"—40"x10" Rahn-Larmon Geared Head Sliding Bed Gap
24"x12" American
24"x13" Chard
24"x16" Lodge & Shipley
24"x18" Lodge & Shipley
24"x22" Lodge & Shipley, taper attachment
30"x12" Whitcomb-Blaidsell
40"x12" Field

Mills

3 Becker-Brainard Plain
Type "B" Briggs Mfg.
No. 12 Pratt & Whitney Mfg.
No. 4-B Becker Vertical
No. 5 Brown & Sharpe Vertical
No. 5-B, No. 6 Becker Vertical
Model C2 Becker Vertical
Type ACS Becker Vertical
24"x24"x12" Ingersoll Adj. Rail
36"x36"x12" Newton Duplex
38"x44"x20" Ingersoll Slab
72"x16"x14" Ingersoll
No. 1 Smalley-General Thread

Planers

24"x24"x 6" Cincinnati
24"x24"x 6" Powell
24"x24"x 6" Rockford
24"x24"x12" Gray
30"x30"x 8" Powell
30"x30"x 8" American
36"x36"x 8" Cincinnati
36"x36"x12" American
36"x38"x18" Cincinnati
42"x42"x12" Liberty
42"x42"x14" Gray
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(1) 3	Northern	29' 6"	440-VAC
(1) 3	P & H	27' 9"	220-VAC
(1) 3	Euclid	34' 3"	A.C. or D.C.
(1) 3	P & H (transfer)	44' 0"	230-VDC
	(with 2-motor hoist cage or fl. op.)		
(1) 5	Niles	35' 0"	115-VDC
(3) 5	Toledo	42' 6"	230-VDC
(1) 5	Champion	42' 6"	230-VDC
(1) 10	P & H	48' 10"	230-VDC
(1) 15/5	P & H	35' 2"	230-VDC
(1) 15	Shaw	41' 0"	230-VAC
(2) 15	Toledo	40' & 47'	220-VAC
(1) 15	Champion	64' 10"	220-VAC
(1) 50	Northern	29' 0"	115-VDC

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3-1000	G.E.	1	H-KDD	13800-2300
1-300	Whse.	3/2	SK	2300-2300
2-300	Pitts.	1	OISC	2200-440/220
2-200	Maloney	1	HE	440-220/110
1-200	Maloney	1	C	2200-220/110
1-200	G.E.	3	HT	2400-480/240
1-200	G.E.	2/3	OISC	2500-2600
3-125	Pitts.	1	OISC	11000-440/220
3-125	Maloney	1	HE	2300-230/460

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**50KW
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1750 RPM with
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controllers to match.

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1	Whiting	10	32'7"	3-A.C.	
1	Toledo	10	50'	3-220V.D.C.	Cab
1	Bedford	10	40'	3-220V.D.C.A.C.M.G.	Set Cab
1	Bedford	7½	46'	3-220V.D.C.	Cab
2	Shaw	5	52"	3A.C.440V.3Ph.25Cv.	Cab
1	Shepard	5	46'6"	3-220V.D.C.	Cab
1	Bedford	5	46'10"	3-110V.D.C.	Cab
1	Whiting	5	22'6"	2-550V.A.C.	Floor
1	Northern	3	37'8"	3-220V.D.C.	Cab
2	Northern	2	37'8"	3-220V.D.C.	Cab
3	Shaw	2	32' to 43'3"	3-A.C.550V.	Cab
1	Bedford	5	37'7"	3A.C.220-3-60	Cab
P&H		2&4	Monorail	220V.D.C.	

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10-ton P&H, 48'5" span, cab control, 3-motors, fish belly girders, 220V. D.C. Motors.
5-ton BEDFORD, 28 ft. span, cab control, Straight "I" Beam Type Girders, 220V. D.C. Motors.

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